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HYPERVENTILATION WITH CARBON DIOXIDE AND OXYGEN IN EARLY BRONCHO-PNEUMONIA

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PART I

BRONCHO-PNEUMONIA—DEFINITION AND ETIOLOGY

I am using the term "broncho pneumonia" in a very general sense to designate that picture so frequently seen following surgical operations on the abdomen; under general or local anesthetics. For example, the patient who on the second or third postoperative day shows two to three degrees temperature elevation, respiration increased above 30, pulse increased, coughing, respiratory distress, chest pain, positive lung findings on physical and X-ray examinations and frequently a cyanosis.

I am not questioning the possible importance of embolus, trauma and hypostasis as etiological factors, but am only presenting the atelectatic phenomena as a probable factor in the development of most pneumonites, whether diffuse and lobular or non-diffuse and lobar.

No consideration of the pathological picture is made because I believe the lung in the first 36 hours of broncho-pneumonia has probably a very different appearance than the lung as seen by the pathologist at post mortem.

ETIOLOGY

There are a number of factors proposed as conducive to development of pneumonia post-operatively. Herman Elwyn in J.A. M.A., states that it is most frequent after operations on the gastro-intestinal tract, appendectomies, herniaotomies, and exploratory laparotomies. He enumerates the following:

1. The presence of infection in the respiratory tract at the time of operation.
2. Hypostatic congestion in old and debilitated persons.
3. Irritation of the respiratory tract from too liberal a use of the anesthetic.

These three factors being present, he describes the mode of production as follows:

"Post-operatively, an area of atelectasis occurs, and if bronchitis has been present, it spreads to the atelectatic area as a site of lowered resistance;" and here we have the primary seat of the subsequent pneumonia.

Coryllos and Bernbaum in their report of their experimental work in lobor pneumonia, state: "We believe that pneumonic infection of the bronchial tree, by itself is not sufficient to produce lobar pneumonia—another factor is necessary; namely, occlusion of the bronchia by the pneumonic exudate. This marks the onset of the clinical syndrome in which we find united the clinical features of an acute lobar atelectasis and an acute pneumonic cellulitis."

Coryllos and Bernbaum's technique consisted in the placing into the right lower bronchus of a dog, pure cultures of pneumococcus of varying virulences and the mechanical plugging of that bronchus. Other dogs with the same dose of pneumococcus placed in the bronchus were used as controls. The bronchus in the control dogs was not blocked. The animals were observed, temperature, blood count and respiration, pulse and repeated X-rays made during the progress of the disease. They constantly noticed that when the culture was old and the amount was small, the control dog developed only a mild pulmonary infection, whereas the dog with the plugged bronchus developed a severe and lethal pneumonia.

GENERAL CONCLUSIONS

"There is a new concept of the etiology of the pneumonias which is applicable to the lobar as well as the bronchial pneumonia; i.e.: the initial plugging of some

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part of the bronchial tree, either by an aspirated foreign matter or a localized pneumonic process which generates a fibrinous secretion, tenacious and viscid enough to plug the bronchus in this point, or the spontaneous collapse of a portion or portions of the lung due to a nervous reflex. The plugging of the bronchus is followed by an absorption of the air from the alveolar spaces supplied by this bronchus and the consequent atelectasis of this area. Subsequent invasion of this area by the pneumonic process gives us the fully developed pnemonic cellulitis."

PART II

HYPER VENTILATION

Definition: Hyper ventilation is that procedure in which, by use of a mixture of 5% carbon dioxide and 95% oxygen as an inhalant, an artificial hyperpnea of from 30 to 40 deep respirations per minute, is induced. This differs from voluntary, rapid, deep respiration, in that the hyperpnea is involuntary and due to an artificial agent. In the former, we have a low CO2 value in the blood stream, in the latter, the carbon dioxide concentration is kept at a high point by its continuous administration.

Technique: The proper mixture of the gasses, i.e., 3% to 5% carbon dioxide and 95% oxygen is delivered to the patient through the mask of any standard gas anaesthetic machine. The re-breather is used and the patient is instructed to breathe as deeply as possible. This procedure is continued until respirations are quite deep and as rapid as 30 to 40 per minute—or until untoward symptoms develop, such as dizziness, headache, fixation of the eyes, increase of the blood pressure to above 175, carpal spasm, (the obstetrical hand) loss of consciousness or convulsions.

The blood pressure must be taken before the procedure is begun and watched closely during the procedure, in order that a development of untoward symptoms may be anticipated and avoided. It is a true and reliable index of the patient's re-action to the procedure. The pulse should be taken before and watched carefully during the procedure. It is well to give the patient who has had abdominal surgery, a quarter grain of morphine before starting the procedure, thus diminishing the pain in the incision; caused by deep breathing.

PART III

INDICATIONS

Recent reports of the use of hyper ventilation as a routine measure following prolonged general anaesthetics, indicate that it should be used routinely as a prophylactic against post-operative, pulmonary complications. It should be used immediately and persistently in all cases of carbon monoxide gas asphyxiation.

It is indicated as a therapeutic measure in post-operative massive collapse of a lung.

Hyper-ventilation is indicated as a therapeutic measure in post-operative patchy atelectasis of the lung, or lobular atelectasis, a condition which I believe precedes the development of the signs and symptoms which indicate a diagnosis of post-operative broncho-pneumonia, that is, hyper-pyrexia, tachycardia, rapid respiration, cyanosis, coughing and chest pain, impairment of the percussion note, inhibition or suppression of the breath sounds over the affected area, bronchial breathing, rales, friction rub, displacement of the heart toward the affected side, and diffuse patchy haziness, of the X-ray picture.

If treatment is started on such a case in thirty-six hours, there is no doubt in my mind but what the development of a frank and generalized, and oft-times fatal, bronchopneumonia, can be prevented.

It is true that frequently the condition does not progress into a definite pneumonia, even if untreated and it is true that bronchi-pneumonia does not always kill the patient, but it appears that probably without treatment, these cases run a more serious course when left alone, than they do when under treatment of carbon dioxide and oxygen.

PART IV

CONTRA-INDICATIONS

This procedure is dangerous in some cases and impractical in others. I will first enumerate them and then discuss them:

1. Hypertension.
2. Epilepsy.
3. In infants.
4. Tuberculosis.
5. High grade neurosis.
6. Well established pneumonia cases with marked consolidation.

1. Hyper-ventilation is impractical and

contra-indicated in a patient who has high blood pressure because the procedure cannot be carried out effectively without elevating the systolic blood pressure to a very high point and thus threatening the patient with cerebral accident.

2. It cannot be used on the patient who is subject to epilepsy or has a tendency to epileptiform seizures because its use is quite liable to precipitate an epileptiform seizure. There is an article in the Archives of Neurology, by J. Fetterman which describes the use of voluntary hyperpnea as a test in epilepsy.

3. I know of no definite contra-indication to its use in the infant, but there is nothing in literature that would justify its use and because of the many unknown dangers in the employment of hyper-ventilation, I do not feel that it should be used in the treatment of pneumonia in an infant.

4. It is obvious that hyper-ventilation would be contra-indicated in a tubercular subject because it is the very opposite of artificial pneumothorax and collapse of the lung, which treatment is at the present time held in such high respect.

5. Hyper-ventilation should be used with great care in extremely neurotic patients, because of their tendency to convulsions.

6. Hyper-ventilation is of course, impractical if pneumonic cellulitis is well established and the consolidation is extreme. There can be no hope of expanding such a lung.

EFFECT ON BLOOD PRESSURE

The effect of hyper-respiration on the blood pressure in man was reported by Swale & Thompson in the Journal of Physiology.[1] From their article it appears that subjects that have a slow pulse would have an increase in blood pressure and a marked coincident increased pulse rate, whereas patients having a rapid or a normal pulse rate would show a lowering of the blood pressure and a delayed acceleration of the pulse rate. This finding is also noted by other investigators and Hill & Flack considered the cause to be an interference to the return flow of blood to the heart.

It is to be noted that Hill & Flack study the effect of hyper-respiration upon the blood pressure and not the effect of hyper-ventilation with CO2. From this we may expect that their findings would be a bit more inconsistent in that the depth and rate of the respiration was voluntarily controlled and the CO2 value in the blood stream would be low. The effect on the blood pressure should be more constant when the hyperpnea is involuntary and due to an artificial agent such as CO2. In the latter case the CO2 value of the blood stream would be high.

In all of our cases in which the blood pressure was checked, we found marked and immediate elevation of the systolic pressure. This systolic elevation was most marked in our sixth case in which the blood pressure would be elevated at each procedure from 20 to 50 milimeters of mercury. On one occasion when the procedure was continued until systolic reading increased to 180 milimeters of mercury the patient developed convulsions.

In all cases it appeared that the blood pressure became more and more unstable each time the procedure was repeated; for example, during the first hyper-ventilation, an elevation of 15 to 20 points might be noticed if continuing the procedure for several minutes, but on the last hyperventilation it was frequently noted that the blood pressure would immediately jump 30 to 40 points in the first minute, and frequently before any important hyperpnea had developed.

Case I: Robust white male adult with compression fracture of 10th dors. vr. Under ethyelene anaesthesia Albee bone-graft was performed 11-29-29. At 5 P. M. the following day the patient had an elevation of temperature of 100 and increased respiration 25 per minute. The second post-operative day at 7 A. M. this patient had a temperature of 102, respiration of 36 and a pulse of 132. On examination, rales were found at both bases. This patient was hyper ventilated with carbon dioxide and oxygen until he had an hyperpnea of 40 deep respirations per minute. That evening at 8:00 o'clock his temperature was 99, his respirations were 25, his pulse was 98. He was again hyper ventilated for three minutes. The following morning his temperature was 98.8, his respirations were 24, his pulse was 90. He was again hyper ventilated for three minutes. From this time on he ran normal T. P. R. Curve.

Case II: Robust white male 36 years of age, who was operated under ethylene anaesthesia for sub-acute appendicitis, 12-11-29. The following day at 6 A. M. this patient had a temperature of 101, pulse 92, respiration 26. At 6 o'clock he had an ele-

vation of 101.2, respiration 28, pulse 82. At 5 P. M. the second day post-operative he had a temperature of 101, respiration of 28 and pulse of 80. He was coughing and expectorating considerable tenacious mucous and examination of his chest revealed moist rales over the right base. He was hyper ventilated for three minutes. The following morning at 7 o'clock he had a temperature of 100.6, respiration of 28, and pulse of 66. He was again hyper ventilated and that evening his temperature was 100, respiration 28, pulse 88. He was again hyper ventilated for three minutes. The following morning, his temperature was 99.2, respiration 28. That evening his temperature was 99.8, respiration 28, and his pulse 84. He was again hyper ventilated. The following day his temperature fell to normal, his respiration decreased to 18 and his T. P. R. remained normal thereafter.

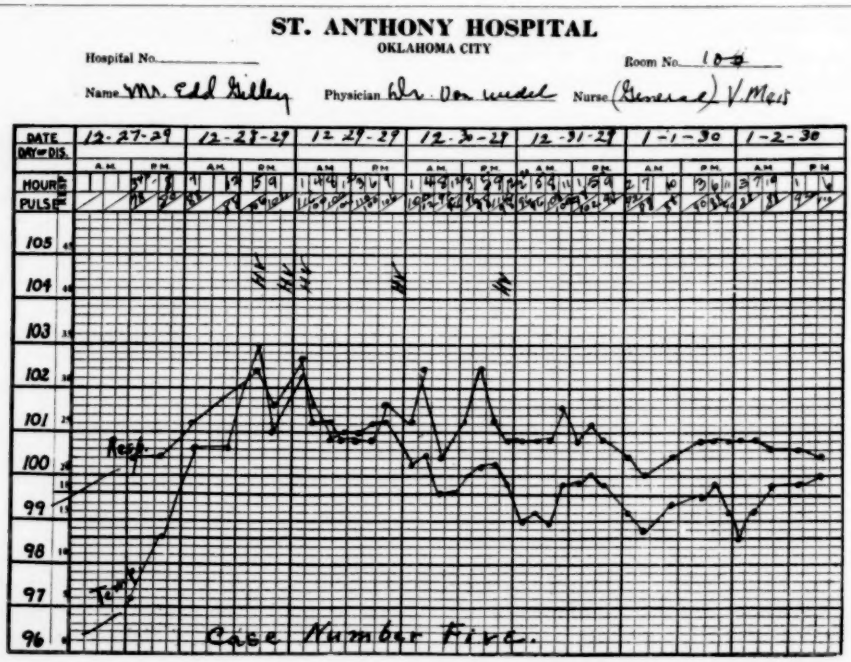
Case III: Robust white male 35 years old with a compound, comminuted fracture of the distal head of the right tibia.

Under ether anaesthesia, this man's fracture was reduced and lacerations about the face repaired. The following day the patient showed a temperature of 103.4, respiration 28, and his pulse was 120. The following afternoon at 5 o'clock he had a temperature of 102, respiration normal and pulse 120. The morning of the third day post-operative the patient had a temperature of 103.6, respiration of 28, pulse 140. Upon examination of his lungs it was found that the breath sounds were suppressed and moist rales were present. He was hyper ventilated for 5 minutes. That evening his temperature was 102, respiration 32, pulse 116; he was hyper ventilated for three minutes. The following morning when his temperature was 101.4, his respirations were 34, his pulse 120, he was again hyper ventilated. On the evening of the fifth post operative day when his temperature was 101, respiration 24, pulse 100, he was hyper ventilated for the last time. The following afternoon he still showed a slight elevation of temperature and respiration but continued to convalesce nicely until a final complete recovery.

Case IV: White male adult, 32 years old, operated 12-14-29 under ethylene anaesthesia for interval appendix.

On the following day, he had a slight elevation of temperature and slight increase in respiration and pulse. On examination of his lungs there was some inhibition of breath sounds over both bases. The patient was hyper ventilated once and thereafter ran a normal T. P. R. curve.

Case V: Fairly well developed, fairly well nourished white male 20 years old, who upon falling from a tank suffered a

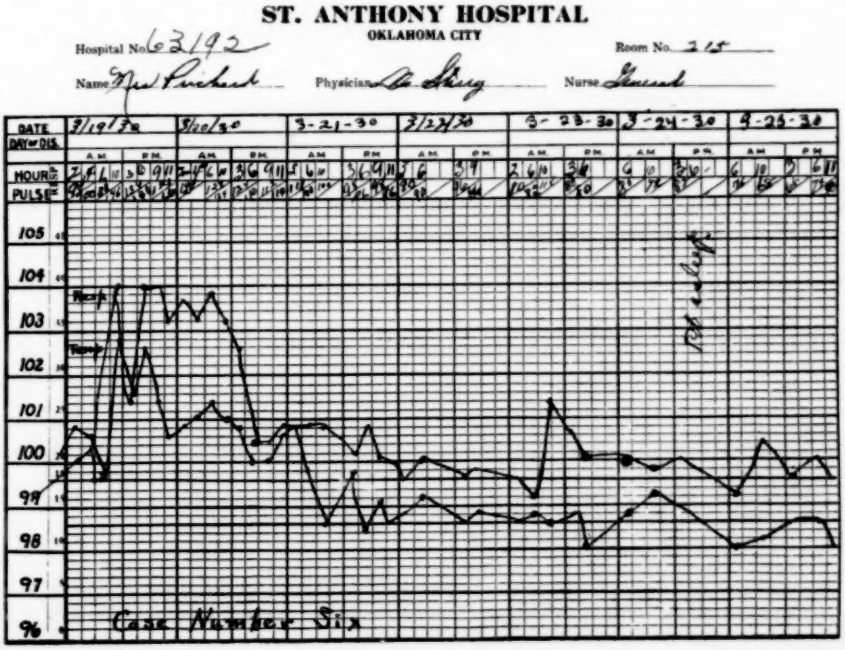


fracture of the 6th and 11th right ribs and a fracture of the left femur three inches above the knee. Under ethylene anaesthesia this fracture was reduced and Boehler's traction applied.

At 5 P. M. the following day, this patient had respiration of 34, temperature of 103, pulse of 106 and physical findings as follows: His respirations were rapid and shallow; the alae nasae would dilate with each inspiration; his lips were cyanotic, he was coughing and expectorating tenacious, bloody mucous. Upon examination of the lungs the breath sounds were found markedly suppressed over the right base and over the left base broncho-vesicular type 2 breath sounds and rales were audible. A bed side plate of this man's lungs was made. This plate showed marked diffuse mottling over both lung fields and a shifting of the heart to the right. It also revealed the fractures of the 6th and 11th right ribs and the line of inter-lobar pleurisy on the right. He was hyper ventilated until he had a marked hyperpnea of 40 for 5 minutes. At 9 o'clock that night his temperature was 101 and his respiration was 28, his pulse 102. At 11 o'clock that night he was hyper ventilated the second time. The following morning he had a temperature of 102, respiration 36, and a pulse of 116. He was hyper ventilated for the third time. That evening at 6 o'clock he had a temperature of 101.2 respiration of 24 and a pulse of 100. He was hyper ventilated for the fourth time. The following morning he had a temperature of 100.2, respiration 34, pulse 112. That evening he had a temperature of 100.2, respiration 25, pulse 114. At this time he was hyperventilated for the fifth time. The following day his highest temperature was 100, respiration 28. A chest plate was made on this day which still showed considerable diffuse mottling of both lung fields. His T. P. R. curve remained practically normal for the next three days when his lungs were again X-rayed. This plate showed marked clearing when compared to the previous plate but still showed some diffuse envolvement of both lungs. This persisting involvment is quite probably due to tuberculosis, because since that date it has been noticed that this patient has run a low grade daily fever.

Case VI: Patient was a young woman twenty-five years of age, rather obese and an habitual smoker of cigarettes. A pelvic operation had been performed under general anaesthetic. I saw her the evening of her first post-operative day.

Examination: Patient was lying in bed, suffering evident respiratory distress—respirations were quite rapid, very shallow and labored. There were audible tracheal rales. There was definite cyanosis of



the lips and finger nails. Her temperature was 104; her respiration was 40; her pulse was 140 and her blood-pressure was 118-78.

Examination of the right lung revealed no definite impairment to percussion. Breath sounds were heard normally along the axillary line as low as the ninth rib at which point there were persistent moist rales. Examination of the left lung: The percussion note was impaired three plus on the grade of four in the axillary line. Breath sounds were entirely suppressed. Friction rub was heard in the axillary line and posteriorly. Anteriorly, the breath sounds were broncho-vesicular type II in character and accompanied by persistent moist rales.

The heart was displaced to the left, the apex beat being palpable in the sixth inter-costal space anterior axillary line. Cardiac dullness was shifted to the left.

Diagnosis: Massive atelectasis of the left lower lobe with coincident early broncho-pneumonia.

This patient was hyperventilated with carbon dioxide and oxygen for four minutes. Following the procedure the patient expectorated some mucous, the cyanosis was cleared, respiration was less labored and deeper and the patient experienced some relief of her subjective discomfort. The blood pressure was elevated to 155 systolic. The following day, the patient was hyperventilated at 7:30 A. M., and at 11:30 A. M., a marked increase in blood-pressure being noted each time. At 6:30 the same day, her temperature was 100, pulse 108, respiration 22 and blood-pressure 120 systolic. At this time, the patient was not cyanotic, breathing was easier and had little or no subjective discomfort, and in general was very much improved. The patient was hyperventilated for three minutes with carbon dioxide and oxygen.

The procedure was interrupted by a generalized tonic seizure which was followed immediately by a brief clonic convulsion. The first evidence of this convulsion was the rolling of the eyes laterally with fixation. Administration of carbon dioxide was stopped at this point but the progress of the convulsion was not interrupted. The blood pressure taken during the seizure was 180 systolic. Patient rallied immediately and stated that she felt fine.

Examination of the lungs revealed no evidence of consolidation. The first time, procedure was discontinued when the blood-pressure was elevated to 118 systolic and the patient complained of dizziness. The second time, the procedure was discontinued when the blood pressure was elevated to 150 systolic and pulse fell to 92. Examination of the left lung at this time failed to reveal impairment of percussion note. Breath sounds were normally present over the entire lung field. This was the last hyperventilation and the patient made an uneventful recovery. It appeared that this patient's blood pressure became more and more unstable with each repetition and procedure. The last three procedures were necessarily very brief because of the immediate rise in blood pressure.

CONCLUSIONS

1. The atelectatic phenomena is an important factor in the development of post-operative pneumonia.

2. Hyper-ventilation is a valuable agent in the treatment of early post-operative atelectasis and broncho-pneumonia.

3. Inhalation of carbon dioxide causes an immediate marked elevation of blood pressure.

DISCUSSION: *L. J. Starry, M.D., F.A.C.S., Oklahoma City*

In the evaluation of recent advances in surgery the newer conception of post-operative pneumonia as post-operative atelectasis should be placed at or near the top of the list. None of us but have been distressed at the appearance of such patients on the first or second post-operative day. Usually our medical friends are called in to equalize the burden and in the majority of cases heretofore the combined efforts are not productive of the hoped for results. Altho these are strictly medical deaths it is the surgical mortality lists which carry them.

It has been my pleasure to note the effects of hyper-ventilation on one of my patients. Gentlemen, it is indeed remarkable to notice the change in both general appearance and physical signs—temperature, pulse and respiration all responded very promptly to the hyper-ventilation. It is my firm belief that thru this method of treatment an increasingly large percentage of patients suffering from post-operative atelectasis and pneumonia will be returned

to health. The paper is an extremely practical one and in my opinion very timely.

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THE CARE AND CLASSIFICATION OF THE INSANE*

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Since insanity has been recognized from time immemorial, it might be well to give a brief historical review of the care and treatment of mental cases before taking up this subject. I shall relate a few interesting facts taken from "A Text-Book of Psychiatry" by Henderson & Gillespie.

Early records of the Egyptians refer to mental disturbances as far back as 1500 B.C. Senility was described as "A condition wherein the heart grows heavy and remembers not yesterday." Arteriosclerosis has been demonstrated in dissection of mummies. The Biblical description of Saul, David, and Nebuchadnezzar are the first authentic cases of mental disorders recorded. Epilepsy was known to the ancients as the Sacred Disease, and was the type of mental trouble with which they were especially familiar. Plato's Republic contains the earliest reference to the treatment of the insane, in which it says, "If anyone is insane, let him not be seen openly in the city but let relatives watch over him in his home," and if they are negligent let them pay a fine." In the time of Hippocrates it was believed that a disturbed mind was relieved by hemorroids and varicose veins.

Starving, flogging, and chains were accepted methods of treatment about the first century B.C., and I believe similar methods were used in the early history of the United States. In 1320, lunacy legislation appeared in England, when it was enacted that the property of lunatics should be vested in the Crown. In 1403, Bethlem, in London, was the first place of care for the insane.

In the seventeenth century, Lydenham prescribed for "mania" a cordial which contained the flesh and blood of vipers and sixty-one other ingredients; canary wine and honey, to be given three times a day. He also advocated bleeding. In Paris, Dr. Dennis employed the transfusion of blood in a love-sick youth, with fatal results.

In the next century the treatment of King George III, who was subject to periodical mental disturbances, aroused great indignation throughout the British Isles. He was under the care of a Dr. Willis, who had the management of a private house, and the King was treated with little respect. There was no hesitation in knocking him down, applying blisters and the strait-jacket. A committee was appointed by the House of Lords to inquire into the matter, and greater public attention was consequently called to the care of the insane throughout the country.

The modern era of the care and treatment of the insane begins at the end of the eighteenth century, and is divided into three periods: 1st, the period of humane reform; 2nd, the introduction of non-restraint, and 3rd, the hospital period.

In 1792, Pinel liberated more than fifty patients in less than a week, some of whom had been in chains for thirty years or more. He provided fresh air, light, freedom and occupational departments. Cases that were unmanageable in darkness and dungeons showed marked improvemet in health and behavior.

Many changes were made throughout Europe to improve the condition of the insane in the early part of 1800. For instance, in 1815, an investigation at the York Asylum revealed that there had been great neglect and cruelty, only 221 deaths having been reported out of the 365 that

*Read before the Craig County Medical Society, May 13, 1930.

had occurred. One patient was killed, and his body disposed of to avoid inquest. Two sets of books were kept to aid in the duplicity.

Dr. Monro, the superintendent of Bethlem, was questioned about the treatment and replied, "Patients are ordered to be bled about the latter end of May, according to the weather, and after they have been bled, they take vomits once a week for a certain number of weeks; after we purge them. That has been the practice invariable for years, long before my time." Strait-jackets were not used as irons were considered safer. Patients were chained nude to the benches; male attendants were in charge of female wards, and the immorality which existed is beyond description.

In 1837, the abolition of restraint was initiated by Gardiner Hill and Charlsworth, in England, and at about the same time by Bond, Kirkbride and Rush, in America. Dorothea Lynde Dix was perhaps the most striking personality of this time. Although handicapped by ill health, she founded approximately thirty-one institutions. She made a trip to Scotland and visited many hospitals, and while the majority were well conducted, she found some badly mismanaged. Naturally, she met with great opposition and was called the "American Invader." However, she was able to accomplish within a few months what others had tried to do for years.

At the present time, in the town of Gheel, in Belgium, feeble-minded children are kept in the homes and treated as the children of the family, being taught whatever occupation they are capable of learning. This is the village plan, and holds great possibilities.

The administration of hospitals for the insane has steadily improved, and I am sure you are all familiar with the modern insane hospital of today.

To commit an insane person to an insane hospital in Oklahoma, it is first necessary for someone to file (with the County Judge) charges of insanity against the individual—this may be done by a relative, neighbor, or an officer other than the County Attorney, or an employee of the hospital. The County Judge then has the authority to appoint two physicians registered in the county to make a mental examination and to return a written report of their findings to him. If the person examined is found insane, the Judge makes out an order of commitment, which is turned over to the sheriff of the county, delivers the patient to the hospital or deputizes someone to do so. Quite often a relative is deputized. If the patient is a female, she must be accompained by relatives or a female attendant—the reason for this is obvious.

We often receive patients who on superficial examination show no signs of mental disease, and who frequently have convinced the accompanying officer that they are victims of a conspiracy, usually among their relatives. Thus the officer tells us of the injustice that has taken place, and urges that we take particular interest in the case—already having told the patient that the charge is an outrage and that the doctors will send him home, almost, if not as soon as he is received. I am sure I have never seen a single instance of this kind in which both the patient and officer were not mistaken.

Each patient must be received by a physician, and a return receipt given to the officer. When the patient is received his condition is observed and information is obtained as to attempts or threats of suicide, violence, etc. He is weighed and measured, and if not in bad physical condition, is taken to the receiving ward. Here his temperature is taken, and all his clothing placed in a bundle to be sent to the marking-room where the clothes are marked with his name and ward, and then returned to him. Money and other articles are removed, recorded and turned in to the main office where they are again recorded and placed in safety. The patient is bathed, closely examined for vermin, scabies, scars, bruises and other injuries, and a record made and placed in the files with his history. He is then placed in bed for twenty-four hours or longer, if necessary. His physical condition permitting, he is then allowed to dress and associate with other patients. A specimen of urine is saved the first night and sent to the laboratory; a blood Wassermann is made the first week and if indicated, a spinal the next week; typhoid vaccine is given each patient under fifty years of age and each patient is vaccinated for smallpox. The urinalysis and blood test are routine.

Meanwhile a physical and neurological examination is made on the ward and recorded. A mental examination is made as soon as the patient's condition will permit or as soon as the staff is able to do so.

If the patient is a suicide, his attendants, both day and night, are so informed and as long as he is thought to be active, "suicide" is written on the daily ward reports, directly after his name—this keeps the fact fresh in the mind of those responsible for him. It is remarkable how few suicides we have had of the hundreds that were so classified. Only one has occurred in the past six years, and this took place under the eyes of the attendants, in spite of the fact that every precaution was taken to prevent it.

If the patient is old and feeble, he is soon transferred from the receiving ward to one suiting his condition. If sick, he is sent to one of the hospital wards where efforts are made to diagnose and cure his physical condition, as in a general hospital. After a cure is effected, he is again transferred to a ward best fitted to his needs.

All wards keep a daily report of each patient, giving his behavior, occupation, illness and the like, this record being turned in to the Superintendent each morning and filed as a permanent record. Also a monthly record is kept of each patient which gives his behavior, illness, medicine taken, days ill, weight at the beginning and the end of the month— this record being filed with his history on the last day of the month. Injury blanks are kept on all wards which in case of injury must be filled in forming a complete record as to how the injury occurred and giving a description of the injury, and the name of the attendant in charge at the time. These blanks must be taken to the superintendent's office immediately, failure to do so being a cause for dismissal from the service.

Of course, occupation is important in the treatment of most mental cases. We make an effort to get the patient interested in anything at all, checkers, cards, sewing, or what not. An occupational department is maintained and many cases are sent there who at first are unable to do other than unravel a sock or wind a ball, who eventually are re-educated and able to do beautiful work. The women are placed in the kitchens, laundry, sewing-room, and on the wards. The men are employed on the lawns, the greenhouse, farm, powerhouse, laundry, carpenter shop, etc. If a patient can be put to work and become interested in his work, progress is being made.

You may be interested in the violent cases, for as you know, many of the laity think of insanity only in the disturbed state. Each patient has to be observed and prescribed for individually. Hypnotics are used rather freely when needed, however, habit-forming drugs are used as little as possible and then only when everything else has failed. Paraldehyde and luminal usually will quiet most cases. Altho morphine and hyoscin are given unhesitatingly in the very badly disturbed, I am sure many cases would die from exhaustion if hypnotics were not given when needed.

Hydrotherapy is probably the most valuable treatment for the disturbed. Tubs with running water, automatically heat-controlled, can be used over long periods of time. We think it best not to leave a patient in a tub over eight hours at any one time, replacing him after an hour's respite; some hospitals, however, keep them three and four weeks, both day and night. The temperature of the water should be 94 degrees in the summer and 96 in the winter.

Neutral packs are very beneficial: the patient is wrapped in sheets wrung out of water at about 68 or 70 degrees and then two dry blankets are wrapped around him. He is then placed in bed or on a table made for that purpose, and ice packs placed under his head. This treatment works wonders in many cases and benefits the majority. The patient should be watched closely, and if very restless taken out after an hour, or wet with water 68 or 70 degrees frequently, as the body causes the pack temperature to rise rapidly. All hydrotherapy must be used with *care*, and the condition of the patient closely observed, altho I have never seen alarming results occur.

The treatment of pellagra constitutes quite a percent of the cases in this section of the United States, and as a correct diet effects a cure, most of the cases recover, especially if not in a dying condition at the time they are received.

Syphilis of the central nervous system is always an important part of any State hospital and remarkable advancement in the treatment of these cases has taken place in the past ten years. Ten years ago we told relatives there was no cure for general paralysis, and that two or two and a half years would undoubtedly be as long as the patient could live. Now, with the new arsenicals, malaria, etc., it is quite a

different story. Although the prognosis of any case of general paralysis is unfavorable, many cases undoubtedly are cured, and a majority improved.

Right here I would like to drop back one hundred years and give a couple or three illustrations of the treatment of the insane at that time.

About five years ago Dr. Neer gave me a book by Rush on the mind. This was the great Benjamin Rush and the book was printed in 1835.

Referring to the treatment for morphine addiction, he claimed that terror by the concussion it gives to both the body and the mind sometimes cures this disease. A lady in New York, a habitual user of opium, was cured by the following remedy administered by the hand of her physician. On one of his visits he took a large snuff box out of his pocket, she looked at it as if she wanted a pinch of snuff; the physician put it into her hands, when upon opening it, an artificial snake that had been coiled up in it suddenly leaped upon her shoulder. She was convulsed with terror and from that time on left off the use of opium, altho she lived forty years longer, dying at the age of eighty.

Cases with suicidal tendencies were often easily cured in those days. The following is told by Dr. Rush. A young man patient in the hospital kept asking for a pistol with which to kill himself. He was told the firing of a gun would disturb other patients, but that his life could be taken more easily by bleeding him to death from a vein in the arm. The man consented at once to this, and the resident physician was ordered to bleed him to death. A vein was opened and after losing twenty ounces of blood he fainted, became calm and slept soundly. The next day, however, he was still unhappy, not from despair and hatred of life, but from the dread of death, for he now had the idea that several persons in the hospital had conspired to kill him. By the continuance of depleting remedies he was finally completely cured.

Another maniac in the Pennsylvania State Hospital expressed a strong desire to drown himself. Mr. Higgins, the steward of the hospital, seemed to favor this wish and prepared water for the purpose. The patient undressed himself and eagerly jumped into it. Mr. Higgins endeavored to plunge his head under the water in order to hasten his death. The maniac resisted and declared he would prefer being burned to death. "You shall be gratified," said Mr. Higgins, and instantly applied a lighted candle to his flesh. "Stop! Stop!" the patient cried. Never afterwards did he attempt to destroy himself or even express a desire to die.

The diagnosis of cases is often quite difficult. Before a mental examination is begun the examiner should have at hand a complete physical and neurological examination, the family history, personal history, and a history of the present attack. The personal history is especially important. Before going further, the question may arise as to what we are attempting to find out. The answer is to find if the patient is insane, the form of insanity and the etiology. Again the question arises, what is insanity? Lord Justice Blackburn once said, while giving evidence before a committee of the House of Commons, "I have read every definition which I could meet and never have been satisfied with any of them, I have endeavored in vain to make one satisfactory to myself, but verily believe that it is not in human power to do it." Nevertheless, it often becomes necessary, especially in court preceedings, to give a definition. A great many men have written their ideas but I will only give a couple that have often been used. "So distracted in his mind to endanger his life or property, or the lives and property of others." Another often used by Peterson, "Insanity is a manifestation in language or conduct of disease or defect of the brain."

We have the patient presented at clinic by one of the staff. All questions and answers are taken down by a stenographer and from the answers to the questions, the history, the neurological examination and the behavior a diagnosis is made. Our classification is the one standardized and used in all state hospitals, and is too long to discuss here. However, before closing, I would like to call your attention to an outline which I believe mainly originated with Ebaugh of the Colorado Psychopathic Hospital, in Denver.

If I succeed in getting the problem of insanity before you clearly, you will probably view the condition in a different light from what you have heretofore considered it.

CLASSIFICATION OF REACTION TYPES

INDIVIDUAL—Plus (What pt. has to react with)	SITUATION—Leads to (What pt. has to react to)	REACTION— (Adjustment—Normal behavior—Maladjustment—resulting in):
A. PHYSICAL 1. Body type 2. Features. 3. Physical defects 4. General health	A. TOXIC FACTORS 1. Focal diseases and infections 2. Drugs 3. Alcohol	A. SEVEN MAIN TYPES OF PSYCHOSES 1. Organic Reaction Type: a. General paresis b. Senile deterioration c. Cerebral arteriosclerosis d. Traumatic psychosis e. Epilepsy, etc.
B. INTELLECT 1. General level 2. Intelligence quotient	B. ORGANIC FACTORS Definite brain changes to explain mental disorders; syphilis and various degenerative neurological conditions, epilepsy, cerebral trauma, etc.	2. Delirious and Hallucinatory Reaction Types (toxic psychoses) a. Alcoholic psychosis b. Psychosis due to drugs and other exogenous toxins c. Psychosis with somatic diseases.
C. HABITS 1. Capacity for habit formation 2. Personal and social habits 3. Industrial habits 4. Drugs, etc.	C. PHYSHOGENIC FACTORS External: Environmental factors, Home surroundings, financial loss, worry, economic stress and strain, etc.	3. Paranoic Reaction Types
D. INSTINCTS 1. Self-preservation 2. Race-preservation 3. Herd	Internal: Disturbances of inner mental life. Repressions, conflicts, reaction to broken engagements, sex episodes, etc.	4. Affective Reaction Types (manic depressive or reactive) a. Depression. b. Excitement c. Anxiety
E. EMOTIONS 1. General Emotional tone 2. Drive 3. Stability		5. Psychoneurotic reaction a. Hysteria b. Psychasthenia c. Anxiety neurosis d. Hypochondriasis e. Chronic invalidism f. Other types
		6. Primary Constitutional Reaction Types. a. Psychopathic inferior b. Mental deficiency
		7. Schizophrenic Reaction Types (Dementia-praecox)
		B. RESULTS After treatment—1st year, 2nd year, 3rd year, 4th year, 5th year.

I regret I cannot throw this formula on a screen for you to study, as it is difficult to explain without something to which I can refer.

We have three points with their subdivisions to consider. There is the individual, the situation and the reaction. The individual must meet the situation and this leads to reaction. The things with which the individual reacts, namely,—the physical, intellect, habits, instincts and emotions, meet the situation consisting of toxic, organic and psychogenic factors.

The individual, (what he has to react with) meeting the situation, (what he has to react to) leads to a reaction. The reaction may be adjustment to the situation and normal behavior or maladjustment, resulting in the seven types of psychoses as given above.

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A DISCUSSION OF THE PHYSIOLOGY AND PHARMACOLOGY OF THE VEGETATIVE NERVOUS SYSTEM*

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The nervous system of vertebrates may be divided into a sensori-motor system and vegetative system. The sensori-motor system regulates the relations of the individual with his environment. Through the various sense organs and nerves, both somatic and environmental impressions are received and recorded. The motor mechanism controls the so-called voluntary muscles in their various functions. Thru them, the position of the body is maintained, and the extremities are brought into action and this action controlled for various definite activities.

The vegetative nervous system controls reproduction, nutrition and growth; it controls such functions as digestion and circulation. This system consists of ganglia and nerves located in the spinal cord and brain, and outside the central nervous system. It is subject to various forms of stimulation—mechanical, chemical and psychic.

There are located in the lower spinal cord, vegetative centers of reflex character, for the control of the urinary bladder, genital organs, spincter-ani, large intestines, and, for the blood vessels of the pelvic organs and lower extremities. There are two definite bladder centers. That for closing the outlet of the bladder is located in the eleventh and twelfth dorsal segments, and in the first and second lumbar segments. The center for emptying the bladder is in the lower sacral cord. The

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upper center is associated with the bladder through a system of afferent and efferent nerves, from the inferior mesenteric ganglion, through the hypogastric plexus.

The ratio of afferent to efferent nerves is one to ten, which explains why the bladder is not very sensitive to ordinary stimuli.

The emptying of the bladder is under the control of the pudic and pelvic nerves, through the sacral plexus. The ratio of afferent to efferent fibers in the pudic and pelvic nerves is one afferent to two efferent. The normal stimulation of these reflex centers is mechanical. A full bladder sends afferent impressions to the upper and lower centers; the sphincter is stimulated to relax, the musculature of the bladder is stimulated to contraction, resulting in a normal emptying of the bladder. It may be stimulated to activity by psychic influence.

For the proper functioning of these lower bladder centers, there must be no interruption between these centers and the higher nerve centers, or, between the centers and the bladder. It is possible, however, in high cord lesions, in which there is complete interruption between the higher nerve centers and the lower cord centers, for the bladder centers to develop an automatic activity, which results in a regular emptying of the bladder—what is known as an automatic bladder.

The center for the genital organs is in the lumbar and sacral cord. There is also a center for sexual impulses located in the brain. These centers control the activity, circulation, etc., of the genital organs, through afferent and efferent nerves in the hypogastric and sacral plexus. These centers are influenced by mechanical, chemical and psychic stimulation.

The center for the sphincter-ani is in the lower sacral cord. This center also responds to mechanical and psychic influences, causing either inhibition or contraction of the sphincter-ani.

The center for the control of the blood vessels of the pelvic organs and lower extremities is in both the lumbar and sacral segments. It controls the tonus of the blood vessels of the lower extemities, uterus, bladder and large intestines, yet the tonus of these vessels does not entirely disappear, even after destruction of the brain and spinal cord.

There are also located in the dorsal and lumbar segments, sweat gland centers, for the lower extremities. These centers respond to stimulation by alteration of the blood mixture, or, by a rise in the body temperature, choking and nicotine poisoning, and, in some cases, by reflex stimulation.

It has been demonstrated by Vulpian that the medulla is not the only point of origin for vaso-motor nerves and their tonus. The cord also transmits vasoconstrictor and vasodilator reflexes. The entire extension of the grey matter of the medulla and cord probably gives origin to vaso-motor nerves and their reflex centers. The cervical cord contains vascular nerves, but no vascular nerve centers. Vascular nerve centers are present in the dorsal cord, lumbar cord, sacral cord and medulla.

Vegetative fibers do not come from all segments of the brain stem and cord; segments are located at the points of origin of the vegetative nerves. These origins are in the brain, in the area of the occulo-motor, fascialis, glosso pharyngeal and vagus nerves, and in the entire dorsal, upper lumbar and sacral cord.

There is a different center for ejaculation and erection. Thomas localized the pilo-motor centers in man, from the first dorsal to the second lumbar segments. It can, perhaps, safely be assumed that all vegetative centers have their segmental centers in the brain stem and cord. The cord is important for the regulation of vegetative processes, yet each individual part takes care of itself.

Goltz and Ewald in 1896 demonstrated that dogs may live indefinitely with no trophic disturbances, inflammations or swelling, with all of the cord removed below the cervical segments. After a short period, the tonus of the cordless animal returns, the intestines function, urine is voided regularly, delivery and lactation proceed normally. Immediately following removal of the cord, there is a temporary paralysis of the organs, probably due to shock.

The vegetative system has stimulating and inhibiting functions, such as vasoconstrictor and vasodilator functions, contraction and dilatation of the heart, musculature of all hollow organs, and orificial sphincters.

According to Bayliss, the vasodilators

are in the posterior roots—are not efferent but identical with the sensory fibers, and he considers vaso-dilatation as an antidromic process. He found that, after extirpation of the abdominal ganglinated cord and stimulationg the vagus centrally, there was vascular dilatation of the lower extremities. He assumed that this, too, was an antidromic reflex. Such an assumption would presuppose the passing of an impulse in the nervous system, from a cell, through the axis cylinder, back to another neuron, or in the opposite direction from the normal course of impulses.

Cardio-inhibitory centers have been located in the brain stem. Inhibitory centers for pilo-motor and gland secretion have not been definitely located.

Porter concludes that the vaso-motor and vaso-reflex have different mechanisms, as he found that the reflex was increased by curare and inhibited by alcohol.

The influence of the vegetative segmental centers upon the organs which they enervate, comes from three groups of stimuli. These stimuli are the regulating influence of the higher vegetative centers, afferent stimuli from the periphery, and the alternating composition of the blood and tissue fluids. The influence of the higher vegetative centers is exerted, mainly, through the segmental centers. In these spinal cord segments are also individually represented, the somatic senori-motor elements.

The vegetative system is not so individually represented in the segments of the cord and brain stem. There it is necessary to interpolate the peripheral ganglia. The influence of segmental centers is far more reaching in effect, than the higher vegetative centers on individual directed innervation.

From the segmental centers, come sympathetic and parasympathetic impulses; from the higher centers, come general directive impulses, which are elaborated on, individually, in the segemental centers. Investigations of the relations of the mid brain to the vegetative nervous system, have been concerned chiefly with its effect upon the smooth musculature and glands, and a study of the complicated processes in organs enervated by the vegetative nerves.

Faradic stimulation to the base of the mind brain produces irritation phenomena of the ocular sympathetic, vaso-motor disturbances, general increase of blood pressure, contractions of the bladder, sweating, secretion of tears, saliva and mucous membrane glands.

If the electrodes are placed posteriorly to the optic tracts at the base of the brain, the cervical sympathetic is stimulated, the pupils dilated. It has been proven that impulses from the frontal lobe to the cervical sympathetic pass over the hypothalamus and, that the hypothalamus exerts its influence on the vegetative organs, independently of the cerebral cortex. This fact proves that the hypothalamus is concerned with centers, and not with tracts.

Karpus and Kreidl believe that the hypothalamus is interpolated as a central mechanism, for vegetative functions. They also found that the subcortical vegetative centers are not limited to the hypothalamus, or mid brain, but also extend into the area toward the lenticular nucleus.

It has been proven that the influence of the hypothalamus centering on the cervical sympathetic, is bilateral.

Stimulation of the hypothalamus results, not only in excitability of the ocular sympathetic, but an inhibition of the sphincter branches of the oculo-motor. It has been proven that the oculo-motor does not alone regulate the movements of the iris cutting the oculo-motor and stimulation of the peripheral branch, or on stimulation of the cortex, or hypothalamus, causes dilation of the pupil.

The hypothalamus has been proven to be an important reflex center. It has also been proven to be both a pain transmitting mechanism, and an important pain center. Schottenback observed that, after destruction of hypothalamus on one side, there was a permanent homolateral contraction of the pupil—a breathing and vaso-motor disturbance. The breathing was delayed and deeper. He concluded from these symptoms that the hypothalamus is the mechanism that innervates the breathing act, and the blood vessels. Leschke injected tetra-hydronaphthylamine, and the result was an extraordinary contraction of the blood vessels, with an extreme rise in temperature, but, on cutting through the mid brain, these effects could not be obtained.

Dresel concluded from his experiments on animals, that (1) in the subthalamus, there are vegetative centers, which influence the blood pressure; (2) these centers

regulate the blood pressure, in such a manner, that in hypertension, a reduction is brought about by stimulation of the parasympathetic, and inhibition of the sympathetic. In low blood pressure, an increase results from stimulation of the sympathetic and inhibition of the parasympathetic. This keeps the blood pressure on a constant level. (3) A vegetative center, important for the blood pressure, is found in the striatum and paleostriatum. (4) This center is responsible for the height of the blood pressure, in that it regulates the subthalamus center. By an increase, due to stimulation of the paleostriatum, the mid brain reacts toward lowering the blood pressure. (5) It appears that the neostriatum has an inhibitory influence over the paleostriatal blood pressure centers.

A stimulation of the hypothalamus will bring about a contraction and emptying of the bladder.

Heat regulation is, perhaps, to some degree, a function of the entire nervous system, but these processes are largely under the influence of the vegetative nervous system. Injury to certain portions of the nervous system, without doubt disturbs heat regulation. It has been proven that the tuber cinereum is indispensable to regulation of body heat. Application of cold to the corpus striatum causes a rise of body temperature, and of heat, a lowering of body temperature. That the cerebral cortex exercises considerable influence over heat regulation, has been well proven. The principal heat-regulating centers, however, are in the hypothalamus and the striatum. There is assumed to be a heat and cooling center, which is in harmony with a contrasted regulation of the higher vegetative centers, for the individual vegetative functions. The higher vegetative centers take part in all metabolic processes.

Claud Bernard observed that a circumscribed lesion in the floor of the fourth ventricle, caused an increase of sugar in the urine and polyuria. More recent experiments on metabolism, have established a sugar center in the medulla. Various investigaters believe that, within the dorsal vagus nucleus, there are vegetative cells, which enervate the suprarenals for sugar mobilization, while in the ant-part, are vagus cells for the pancreas, which control glycogen formation. They also concluded that in the striatum, are superordinated centers, over the subthalamic centers, which regulate the height of the blood sugar.

Leary also assumes that, in the vegetative medulla nucleus, there are present, in a small space, cells for the suprarenals, for breathing, for the heart-beat, nutrition and metabolism. He believes this system has its caudal central representation in the vegetative oblongata, and its most oral representation in the striatum. A center for fat metabolism and sexual atrophy in the mid brain, has been well established, and a center for the sexual function is assumed; emotion and instinct also have centers in the mid brain.

That there is a close relationship between the vegetative nervous system and the internal secreting glands, has been well proven. An alternating composition of the blood acts on the excitability of the vegetative centers, and the internal secreting glands exert an influence upon the chemical composition of the blood. The influence of the internal secreting glands on general metabolism is of considerable importance.

The tonus of the body is influenced by the vegetative centers. This is especially true of the vegetatively enervated organs. Normal sleep and disorders of sleep are, to some degree, related to the vegetative nervous system. The regulation is assumed to be in the brain stem. The phenomenon of sleep is also assumed in the changeable effects between the brain stem and the cortex.

Maunthner concluded, in 1890, that sleep is essentially an interruption of stimulation to the cortex and the central gray matter is where the interruption takes place. He pointed out that hypnotics inhibit the central gray matter, and narcotics stop the function of the cortex.

Economo considers the vegetative apparatus as the essential sleep-regulating mechanism; that the normal periodic changes between wakefulness and sleep are a vegetative function of the entire organism; that in the transitioral or between the interbrain and mid brain is the sleep-regulating center which is active during sleep and waking periods. Inflation of the third and lateral ventricles will produce somnolence. Lesions of the corpus striatum—as in lethargic encephalitis—will produce prolonged somnolence.

The subcortical vegetative regulating mechanism is, to some degree, under the

control of the cortex, and, there is no doubt that our entire animal life, including the activity of the cerebral cortex, is under a vegetative influence.

There are many conditions which determine the susceptibiltiy of various parts of the body to toxins. Some of these conditions are the concentration, quality, penetration and duration of action of the drug, the tonic state of the affected area produced by the central organs, and on the existing state of irritability conditioned by the fluid mixture, in which the acidity or alkalinity, and the increase or diminution of promoting or inhibitory salts and hormones play an important part.

Drugs may be classified as sympathicotropic, vagotropic, and amphotropic in type. There are many external influences capable of modifying and influencing changes in the vegetative reactions, and of the psychic condition. Among these influences may be mentioned: light, air, external temperature, quality and quantity of food, hunger and thirst, rest and work, and the changes—both physical and chemical—and hormonial composition of the blood, and fluids; also, the psychic state. The therapeutic results obtained by the administration of irritant bodies. Fever, therapy treatment with hormones and vitamines, must be credited largely to the alteration in the vegetative nervous system. In order that the vegetative life may properly be adjusted to the constantly changing somatic and external conditions, there must ever be change in tonus and irritability of the vegetative nervous system.

The irritability of the vegetative centers, lying mostly in the mid brain, is determined by centers at a higher level, and, by the hormonal glands, especially the posterior lobe of the hypophysis, the supratuberal hypothalamus area and the tuber cinereum. From these areas, secretions are thrown into cerebro-spinal fluid, which affect the blood pressure and uterus. They control the state of irritability of the vegetative centers in the mid brain, in such a manner, that a decrease of these secretions results in functional disturbances of the water center in the thalamus (diabetis insipidus), a lowering of temperature and disturbances of other centers of metabolism. There is an increase of these secretions after excitement.

The vegetative centers may be excited and inhibition can be brought about by centripetal nerve stimulation, especially through the blood. This can be observed by carbonic acid in the blood, which affords a breathing stimulus, also a stimulation and regulation of the water, salts and sugar content of the blood which are subject to constant rise and fall.

The heat centers in the thalamus-striatum are also regulated by the blood temperature. Blood of subnormal temperature acts as a heart stimulant, and blood of high temperature as a parasympathetic cooling stimulus. Over stimulated or under stimulated centers are sensitive to opposite stimuli, and produce an opposite regulation. A heat center, over-stimulated by fever, can be braced by antipyretics; a heat center not over stimulated cannot be so braced. The heat center is altered in its susceptibility by a changed content of the sugar or salt in the blood. Antipyretics inhibit the salt center, and insulin may lower a high temperature. Narcotics are toxic to the cerebrum, since they dull the pain centers; cortical sensibility disappears in chloroform and ether narcoses, even before the loss of consciousness; opiates paralyze the pain centers of the cerebrum, before it induces sleep; other hypnotics which do not grossly influence the sensation, inhibit cerebral activities. Examples are: Alcohol, amylene hydrate and chloralose; chloral hydrate raises the cortical inhibition to the vegetative brain stem centers, and paraldehyde which deinhibits the water center in the vegetative brain stem, are also examples. The bromides seem to be sedative to the cerebrum. Most cortical hypnotics are unable to inhibit the inter brain and mid brain vegetative centers, and, in small doses, cannot control the motor irritability or coordination disturbances of the brain stem.

The hypnotics in most common use at the present time are, the urea products, of which barbital, phenobarbital or luminal, somniphen, elixir alluriate, allonal, are the best known. They exert their influence on the brain stem in the region of the vegetative centers, rather than on the cerebrum. Of similar action, are chloretone, valerian and magnesium salts. These exert a sedative influence on the thalamic motor brain area, when administered in doses insufficient to induce sleep. They inhibit choreiform movements, the vomiting center and the diuresis center and, to some degree, the heat center. Excessive doses of the urea products produce gross coordination disturbances.

Hypnotics which affect the cerebrum, are alcohol, amylhydrate, chloralose, paraldehyde, chloral hydrate, bromide salts and morphine. Sleep remedies, therefore, may be divided into two classes—depending upon their point of attack and sleep-producing qualities. It has been well proven that their influence is not alone on the cerebral cortex, but also upon the brain stem. After removal of the cerebrum and corpus striatum, there is a spontaneous period of sleep and wakefulness, and the animal responds to the action of various hypnotics. Deep sleep may be induced by smaller doses of hypnotics, than in the normal animal. This is true, whether the hypnotics be of the cerebral or brain stem type. This sleep begins with paralysis of the body posture and of labrynthine reflexes, and with complete deinhibition of the thalamic pseudo-pain center. The fact that the decerebrate animal responds, by sleep, to cerebral hypnotics, proves that cortical hypnotics also inhibit brain stem centers and tracts. It seems from these experiments, that all sleep remedies affect the brain stem. Experimental injuries to the thalamus, corpora quadrigemina, and aqueduct, produce a somnolence that may last for several days.

Some drugs both excite and inhibit different parts of the brain. Atropine excites both the cortex and brain stem, while scopolomine is sedative, and may induce sleep. In severe coordination disturbances, such as Parkinson's disease, and in motor excitability of acute mania, it is sedative, by inhibition of the motor coordination center of the brain stem, and also deinhibits the thalamus, the sleep mediation center for the brain stem.

Sleep induced by magnesium salts may be quickly interrupted, by intravenous injection of calcium chloride. Magnesium salts induce sleep by action upon the thalamus, while the calcium salts stimulate the corpus striatum and the cerebrum, and produces a prompt awakening. This indicates that the cerebrum, thalamus and corpus striatum, for sleep and awakening effect, have a mutually influenced boundary line—any alteration in the state of one, influences the sleep and wakefulness of the others.

There is a latent susceptibility to sleep in the thalamus, which is disturbed, mainly, by stimuli from the cortex or striatum, and any obstruction to the stimulating tracts, is a preliminary condition to sleep, in a predisposed thalamus, and the nearer to the thalamic sleep centers, the stimulating tracts are blocked, the more prompt and more profound is the sleep. This offers an explanation as to why thalamus animals will be put to sleep by drugs which have no hypnotic effect on the normal animal. If the stimulatory effects of the fore brain over the thalamus, be removed, such drugs as ergotoxin, apormorphine and calcium salts, which are not hypnotic, are capable of inducing sleep. Such substances as increase the centrifugal stimuli of the cerebrum and striatum or centripetal stimuli, from the periphery region of the thalamus, induces insomnia. Caffeine, cocaine and camphor stimulate the cerebrum, and tend to produce wakefulness, as also do subcortical stimulatory poisions, as B—tetrahydronaphthylamin, epinephrine and ephedrine. It is worthy of note that cortical stimulants, such as caffeine and cocaine, which normally produce waking stimuli in the brain, and can readily break through sleep produced by chloral—a cerebral hypnotic—are entirely ineffective in the decerebrate animal, while substances which stimulate the brain stem centers, such as tetrahydronaphthylamin, ephedrine, cardiozol and exeton, stimulate to awakening, the decerebrate animal, from a profound chloral sleep.

Many explanations have been offered of the onset of sleep. Economo and others concluded, as the result of experiments on animals, and pathologic anatomic observations, that the onset of spontaneous sleep, also sleep induced by medication, depends on the irritability of the thalamic boundary area in the interbrain and mid brain. An investigation of cramp-producing toxins reveals that, in addition to their influence upon the typical motor and animal reflex centers, they also influence vagus centers; others affect, mainly, sympathetic centers. Picrotoxin is a typical parasympathetic toxin. It stimulates the vagus center in the medulla, the oculomotor center in the corpora quadrigeminia, the parasympathetic, salivary and sweat centers, and like santonin, camphor, cardiozol, phenol, aconitine and veratrine, reduces temperature probably by stimulating the parasympathetic cooling center, and, by central inhibition of heat production. Caffeine, cocaine and B—tetrahydronaphthylamin are central sympathetic stimulating poisons, and produce central vasoconstriction, increase heart beat, central sympathetic pupil dilation, raise temperature by

stimulating sympathetic heat centers in the hypothalamus.

Sherington has described pseudo-pain reflexes coming from a center in the mid brain, through sympathetic tracts, which express themselves as defensive movements—crying reflexes, changes in breathing, tear secretion, distortion of mimicry, pupillary dilatation, and other evidences of displeasure or pain. These pseudo affective reflexes are normally stimulated through cortical pain centers, and are depressed through special inhibitory tracts, from the cortex.

Most drugs that eliminate the sensation of pain from the cortex, also prevent stimulation of the hypothalamic pseudo-pain center, by interruption of the reflex tracts, from the cerebrum to the mid brain. Those drugs which reduce and calm pain, also reduce high temperatures.

Hypnotics and narcotics reduce the irritability of the heat centers in the corpus striatum, and hypothalamus. It has been proven, by experiments, that the heat centers are in the basal and middle posterior two-thirds of the central grey matter of the mid brain, and, are controlled by a superordinated straite center. The point of influence of antipyretics is near the sleep-regulating center. This explains why antipyretics can be substituted for hypnotics, and the combined action of hypnotics and antipyretics, by inhibiting irritation impulses to the thalamus, increase the soundness of sleep. Antipyretics and analgesics act together in reducing pain, as the tracts and central nuclei of heat and pain are close together in the mid brain.

Metabolic cellular processes are regulated centrally. Both the elimination and absorption of such substances as water, salts, sugar, fat and albumin by the tissue cells, have a central control and turgor and tonus are regulated, alteration of fluid absorption and elimination of striated muscle, has been observed, after excluding central sympathetic control. There is also a disturbance of metabolism of ammonia, glycogen, lactic acid and lacto-diogenic substances in the muscle cells.

Rosenow and Hoff proved that the blood picture is influenced by brain stem centers. The vomiting centers in the thalamus may be controlled by sedatives; reflex and directly stimulated vomiting may be checked by such drugs as phenobarbital, barbital, valerian and chloretone, apomorphine —vomiting may even be so controlled.

There are important respiratory and circulatory regulating centers in the mid brain, and it is by action upon these centers, that morphine, chloral hydrate and other hypnotics exert favorable influence upon the course of oedema of the lungs. Oedema of the lungs occurs before apoplectic insults and in pre-eclamptic women, with no disease of the heart, and in post-apoplectic paralyzed limbs. These conditions are probably dependent upon disturbances in these centers.

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TRIGEMINAL NEURALGIA

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Gould's dictionary defines neuralgia as "a severe paroxysmal pain in the area of distribution of a nerve or along its course."

Trigeminal neuralgia major or, as it is called, tic douleureux, is the most frequent and the most severe of all forms of neuralgia. Formerly regarded as the most intractable of all, it is now of all the varieties, most easily, certainly, permanently curable.

This disease is one of which the etiology still remains undetermined, and the pathology yet unknown. Without favor, it strikes rich and poor and, while the age of 35 to 50 seems its time of election, a case has been reported in a child nine years old and I have seen it in one past four score and ten.

This disease, like so many other diseases of unknown origin, and like the shortness of human life, has been attributed to bad teeth. But it occurs in those who have clinically perfect dentures as well as in those entirely edentulous, and the removal of teeth—any or all of them—is utterly futile as a therapeutic measure. Yet, notwithstanding this fact, tooth extraction is the therapeutic measure most commonly employed.

The fact that the disease most rarely occurs in the first division is the chief reason for blaming the teeth, another is that the initial pain is often—or seems to be—in one of the teeth. The middle division is the one most frequently involved.

In one hundred cases operated upon, 64 were females, and this is about the proportion found in other clinics.

The patient is most often one who otherwise has always enjoyed good health, and the first attack comes as a decidedly painful surprise. The story of its first onset is somewhat as follows: "while at work, I suddenly felt a very sharp, stinging (some say cutting, tearing, burning, shooting) pain in my face (less often—tongue, tooth, gum, lip, or cheek). It lasted for about half a minute and was gone."

Almost invariably the patient can indicate *with one finger* the spot where the pain begins, and it often happens that a light touch to, or movement of, this spot (trigger point of Patrick) causes a spasm of pain. I have never yet been able to excite a paroxysm by pressure outside the area of the division involved.

While the patient is recovering from his surprise and wondering what could have caused him such a severe paroxysm of pain, he is often struck by a second spasm, but the second may not come for some hours. The interval between paroxysms varies from two to ten minutes. During this time, there is entire freedom from pain, but the patient lives in anxious dread of the next spasm.

During the spasm the patients vary much in their behavior. One grasps the face in his hands, one rapidly and forcibly rubs the part involved—I have several times seen the skin "rubbed off" leaving a raw, glistening, weeping surface—another distorts his features or writhes in agony, and I have seen a man throw himself on the floor and cry aloud, yet another quivers, clamps the jaws together and sits immobile and expressionless as stone until the terrible ordeal is over.

During the spasm it is quite common to see the veins on that side of the face become distended, the conjunctiva congested, the tears flow and the saliva drool. In others, spasm of the muscles of that side is marked (7th and 5th cranial nerves).

Between spasms there is no pain whatever. If there is, it is likely not true tic douleureux. Sometimes the skin of the face and the hair in the trigeminal area of that side become sensitive to light touch, but usually there is no soreness. It is true that the patient neither washes, combs, nor shaves on that side (neither does he eat, drink or speak more than he can avoid) but this is because touch or movement, as I said before, is likely to provoke a paroxysm. The spasms recur at varying intervals throughout the day, and in the first attacks usually cease when the patient goes to bed. Later on, however, sleep is interfered with and opiates are resorted to.

An attack lasts at first usually only a few days and the patient may not have another for a year or longer. As time passes, the free interval shortens and the attack lasts longer. They sometimes tell me they have had no rest for three or even six months.

Now, patients who have constant pain have not tic douleureux, nor do patients with tic douleureux have pain outside the trigeminal area. A knowledge of these facts helps greatly in establishing a diagnosis and effecting a cure.

There is no other disease that I know of so amenable to treatment. There is no treatment that is worth considering other than (1) deep injection of alcohol for temporary relief and (2) root section for permanent cure.

Alcohol injection was devised by Schlosser in the early years of this century. It consists in injecting into the sheath of the division involved, just where the latter leaves the skull, one or two c.c. of 70 to 80% alcohol. If the needle strikes fair, degeneration of the nerve fibers with consequent analgesia of the area follows: This can be done without anaesthetic (it is very painful, but quickly over and is more certain than when done with anaesthetic). The relief is immediate, and on the average, lasts over a year and may be repeated when needed again. However, with each succeeding injection, the period of relief is likely to shorten, and after a third or a fourth, relief becomes impossible. It is obvious that alcohol injection is not a method that can be used safely to relieve pain in the first division because of the danger to the optic nerve.

As a permanent cure, root section is the operation of choice. It consists in cutting the fibers of the sensory root just proximal to the Gasserian ganglion. The story of the development of the operation is interesting, but it must suffice here to pay tribute only to Spiller of Philadelphia, at whose suggestion Frazier of that city first performed it. It has now stood the test of nearly thirty years, and in America has entirely displaced removal of the Gasserian ganglion as Spiller intended it to do. In practically every country in Europe, ganglion removal is still the operation of choice.

To perform root section, it is necessary to open the skull as it is in ganglion removal, but the dangers of the latter are, as shown by published statistics, more than ten times greater.

It is my very firm conviction, speaking with regard to operations in general—I am a general surgeon—other things being equal local anaesthesia with one-half percent novocaine is less dangerous than any general anaesthetic known. And for any operation on the scalp, skull, or brain local anaesthesia has many other decided advantages. I have performed the operation of root section under general as well as under local anaesthetic and I know whereof I speak.

When first the operation was devised by Frazier, surgeons were content to avulse the whole root—both motor and sensory parts—from the pons. At present again following the lead of Frazier, it is the custom to save the motor root.

As said before, the disease rarely attacks the first divisin. This led Jonathan Hutchinson, Jr. of London to conserve the upper part of the ganglion. He was at that time a believer in ganglionectomy. For the past six or seven years—again following the lead of Frazier—most surgeons aim to save such fibers of the sensory root as arise in the upper part of the ganglion. When this is done it is of inestimable advantage, since by it the post-operative conjunctivitis, corneal ulcer or even total loss of the eye are prevented.

This I do, except when the first division is involved in the neuralgia. In the first in whom I tried it, I left too many of the fibers, and in six weeks the patient was back with pain in the middle division. This is the only patient in all I have done who had to be operated a second time. Local anaesthetic is of the greatest value when it comes to deciding which fibers to leave and which to cut.

The most erroneous impressions exist in the minds of the profession regarding this operation. Patients are often deterred by their physicians from having this operation performed. One must, therefore, consider the various unpleasant consequences that may ensue.

Numbness of that side of the face and mouth is inevitable. It is very unpleasant at first, but soon is not noticed at all.

Facial paralysis (7th nerve), the origin of which is not yet known, occurs in a certain percentage of the cases. It may last a year or more, but it is said not to be permanent.

Eye trouble will ensue in those cases in which the whole root is sectioned unless the patient is intelligent enough to obey instructions. When cornea and conjunctiva are anaesthetized dirt is likely to get in. The patient is instructed to bathe the eye in warm saline before going to bed, and to wear a goggle when in wind or dust. Those who obey have no serious trouble.

Post-operative pain. Practically all of the patients have peculiar para-esthesiae around and in the area denervated. These are unpleasant, but they soon pass and they are never so terrible as the original pain.

Some extravagant statements are made to patients regarding the mortality of the operation. The operation as practiced in the largest clinics in the United States for the past ten years carries, I believe, a mortality of about one percent. I have, all told, performed the operation of root section under local anaesthesia more than one hundred times (101) without a death.

What other major operation has such a low mortality?

University Club Building.

FOREIGN BODIES IN THE EYEBALL*

W. ALBERT COOK, M.D., F.A.C.S.
TULSA

Foreign bodies in the globe of the eye may be specified as magnetic and non-magnetic, and as this brief paper deals only with foreign bodies which have entered the interior of the eyeball, we will pass over the many foreign substances which become embedded in the cornea and sclera.

The first procedure, when we are confronted with a case which gives a history of being hit in the eye by a foreign substance or where we can locate a penetrating wound of the eyeball, is to determine whether the object struck the eyeball and did not enter the cavity of same, or whether it penetrated the different structures of the eyeball. The majority of cases are caused by a piece of metal from a hammer or chisel breaking off and striking the eyeball with such force that it is impossible

*Read before the Eye, Ear, Nose and Throat Section, Annual Meeting Oklahoma State Medical Association, Shawnee, May 26, 27, 28, 1930.

for the patient to tell whether it penetrated or not. If we see the case a short time after the injury we are often able to locate the foreign body in the globe of the eye with an ophthalmoscope, but in many cases there is an interocular hemorrhage which makes it impossible to get a view of the fundus or interior of the eye. The X-ray with a localization chart can usually make our diagnosis and give us the location, which enables us to select the site for our operation for removing the substance.

After the foreign body has been localized, the next question is to determine whether it is magnetic or not, and we are often greatly assisted if we can see the tools the patient was working with at the time the accident occurred, as we are very often able to locate a small fragment from the hammer or chisel or the substance he was working on. It is often possible to insert the point of a magnet in the wound caused by the entrance of the foreign body and extract it through the same opening it entered the eye. Often times these particles will pass through the chrystalline lens and lodge in the vitreous or choroid without causing an opacity of the lens, and several cases have been reported where the tip of the magnet was introduced into the corneal wound, and the foreign substance extracted through the same tract where it penetrated the lens. In some cases where the foreign material is behind the lens it has been successfully removed by dilating the pupil and applying the giant magnet over the cornea near the limbus, and manipulating it so that the foreign body has been pulled around the lens when it is extracted through the opening it entered, or by an opening made into the cornea preferably at the bottom near the limbus.

It seems strange, but it is nevertheless true that particles entering the interior portion of the eye will sometimes pass through the lens and cause a slight opacity and the rest of the lens remain clear. We recall an interesting case along this line where the fragment of steel penetrated the cornea, iris and upper margin of the lens and same was removed, through a scleral opening superiorly, which healed perfectly and the lens had a V shaped opactiy with the point radiating toward the center, but the remainder of the lens remained clear, and the patient had 20-40 vision with a cylinder correction.

Many of these foreign bodies are so small that it is very difficult to extract them unless, with the aid of your localization chart you can place the tip of the magnet almost if not in contact with it, as these pin point particles do not have enough substance to be dislodged from their location and many of them are embedded in the walls of the choroid. Many of these small particles become incisted and lie quiescent indefinitely while others are dissolved and we get siderosis with a discoloration of the iris, in which case there is nothing we can do, and the eye will have to be enucleated sooner or later.

During the winter months we often see where fine chilled bird shot has penetrated all structures of the eyeball, and usually with such force that they become embedded in the posterior wall and I recall a case which came in about ten years ago in which the shot had passed through the cornea, lens and posterior wall and was embedded in the orbital fat on the nasal side of the optic nerve. After the inflammation had subsided in this case we had a traumatic cataract, but the last time the case was in two years ago it was still passive and has never shown any signs of sympathetic ophthalmia, and is no doubt incisted.

Another interesting case came in last December, in which the shot had passed through the upper margin of the cornea and 48 hours after the accident the hole could be seen with the ophthalmoscope in the choroid internally and below the disc where the shot had passed out of the eyeball and become lodged in the orbit. There was considerable lagophthalmus which at first looked as if we might be getting a panophthalmitis, but the inflammation gradually subsided, but after the first four days it was impossible to get a view of the fundus as there had evidently been a late hemorrhage, and there was no fundus reflex for four or five months. At the last examination it seemed to be clearing up and if its absorption continues there is a possibility that the patient may regain some vision, as the shot is no doubt incisted and may remain dormant indefinitely.

Another very interesting case had a piece of steel in the chrystalline lens which we were unable to extract with a magnet so we extracted the lens which had become opaque and found the article of steel almost in the center of the lens.

Fortunately this man regained useful sight in said eye with the aid of glasses, for there was no vision in the other eye.

It is remarkable the size of some of the particles that accidentally enter the eye. It was our good fortune to remove one which, nearly rectangular, 8mm wide, 12-mm long and 4mm thick, in which case the eyeball was preserved, but no vision. This was removed through the wound it had entered at the limbus, and strange to say there was no infection following its removal.

1107 Medical Arts Building.

DETACHMENT OF THE RETINA*

L. C. KUYRKENDALL, M.D.
McALESTER

I do not have occasion to see many cases of detachment of the retina and when I do see a case it becomes very interesting to me and provokes quite a study in order to determine the causative factor more especially if there is no history which will help to clear up the diagnosis. The degree of separation as well as extent and time which as elapsed since the detachment influences the picture and often times adds greatly to the puzzle. There are so very many pictures which flash before you with the ophthalmoscope that often times it is quite some time before you are able to state definitely the condition you are dealing with.

I have found the diagnosis of retinal detachment everything but easy and the determination of the cause thereof much more difficult. I am, therefore, prompted to give you some thoughts of this condition because of a case on hand at the present time which to me is very interesting and which has caused me no little worry and concern.

As the name implies, detachment of the retina is a condition wherein there is a separation of the retina from the underlying choroid and is one of the most serious conditions with which the oculist is confronted, especially as regards the function of that particular eye.

This condition is found more often in men than women and while not often found in children it is not so uncommon. Some authors state that it is very rarely found in children, but most often in men between the ages of 45 and 60.

There are two types with which we have to deal, the traumatic and idiopathic. Under traumatic, conditions producing a detachment of the retina are; first, wounds of the globe, especially penetrating wounds and severe contusions or blows directly on the globe or of sufficient violence to the head. Second, we have the different intra-ocular operation such as iridectomy, cataract extractions, and operations for glaucoma as well as the release of synechia, especially if loss of vitreous occurs, then, too, we have detachment of the retina being caused by the choroid undergoing extensive shrinking following certain inflammatory conditions. It may also follow irido-cyclitis, although it rarely ever follows any of the different forms of retinitis, the exception being albuminuric retinitis of pregnancy. It will be found, or rather it is found, in the majority of these cases we have a myopic eye with which to deal. This is explained by the stretching of the sclera and choroid incident to the myopic condition.

Under idiopathic causes we find coughing the most frequent cause and usually follows a violent attack of coughing such as is produced by whooping cough in children or a sudden strangulation in an adult. Other factors producing the condition are intra-ocular tumors, childbirth, excessive anger, great fear, undue exertion, especially in lifting, vomiting, stooping, sneezing, and hiccoughs.

ETIOLOGY

As the retina lies upon but is not connected with the choroid except at the papilla and the ora serrata, it is possible then for detachment to take place either when there is sufficient pressure behind it or when the pressure of the vitreous is not sufficient to keep it in its normal position. In other words any condition which reduces the normal vitreous pressure against the retina may produce detachment. Likewise any condition existing beneath the retina which is sufficient to overcome the vitreous pressure whether the vitreous pressure be normal or reduced may produce detachment. Any condition producing a change in the vitreous may so far reduce the pressure as to make it a negative pressure. When this occurs it then acts as a traction.

Detachment caused by or following vitreous changes produces such a cloudy media that it cannot be seen with the ophthalmoscope, consequently when that has occurred we must then rely upon the sub-

*Read before the Eye, Ear, Nose and Throat Section of the Oklahoma State Medical Association at Shawnee, Oklahoma, May 26, 27, 28, 1930

jective symptoms and the very great retraction of visual field along with the greatly reduced tension of the globe.

Serous detachment, a detachment characterized by the transudation of fluid from the choroidal vessels may follow changes in the vitreous from inflammations or may occur in a high degree myope where there has never been any inflammation and is by far the greatest danger the highly myopic eye may encounter. This phenomenon has never been satisfactorily explained.

Serous detachment may be due to injury or disease. The detachment occurring in the aged without apparently any diseased condition having existed at any time, in all probability is brought about by senile changes in the vitreous itself.

There are several other forms of detachment which are deserving of mention and study. There is that form produced by hemorrhage whether caused by violence or injuries. Spontaneous hemorrhage occurs and often it is impossible to find the cause unless it be in a person with high blood pressure. Tumors of the choriod produce a detachment which is charaterized by distinct differences from those of the serous or hemorrhagic type, as I have shown under diagnosis.

Cysticercus subretinalis might easily be mistaken for retinal detachment but there are definite characteristics which differentiate them.

PATHOLOGY

Leber, Nordensen, Raelhmann, and Vail have all advanced theories as regards detachment of the retina.

Leber's theory is that in all non-traumatic cases the detachment is due to a shrinking of the vitreous humor which produces a rent or tear in the retina which allows the fluid then to pass through and by gravity increase the separation.

Nordensen agrees with Leber but contends that the primary condition was in the choroid and ciliary body which then produced fibrilliary degeneration which in turn produced contraction of the vitreous that had become attached to the retina, usually in the upper part although it may occur at any point.

Raehlmann's theory is that there is an exudation from the choroidal vessels and that diffusion of vitreous ingredients, which are less albuminous then the exudation from the choroidal vessels occurs through the retina, thus lifting or pushing the retina away from the choroid.

Vail's theory is that there is a paralysis of the secretory function of the ciliary processes. This means that the secretion of aqueous is suddenly arrested. There being nothing wrong with the drainage channels within the eye the watery elements find ready egress thus causing a minus tension. Leber found 90 per cent. had minus tension. The withdrawal of normal tension causes passive hyperaemia of the blood-vessels of the tunica vasculosa. This allows diapedesis and transudation. The vitreous contracts because it loses its percolating supply of aqueous which soon drains off through the efferent channels which are wide open, and the fibers of the vitreous naturally contract as a sponge would contract after losing its water.

At the beginning of the condition the detachment is only partial. It is usually confined to the upper portion, although it may occur at any point except the ora serrata and the optic disc, and by gravitation involve all or nearly all of the retina. Usually when we see these cases the detachment is already low down in the retina. When the detachment has become complete, and the tendency is for them to do that despite all modes of treatment we find the field of vision very greatly reduced and the optic disc and ora serrata the only points where the retina is attached.

Usually only one eye is affected altho it may be bilateral.

Cataract is common in the later stages of detachment, as well as vitreous opacities.

SYMPTOMS

In considering detachment of the retina we must consider the symptoms under two divisions, the subjective and objective.

Under subjective symptoms one of the first things complained of is dimness of vision. This may be manifest only by an inability to see distinctly or it may assume greater proportions. They will complain of metamosphopsia (objects appearing crooked) and photopsia (flashes of light, sparks, dust, soot, or dark clouds). There is no pain in these cases unless it is complicated with some other condition. Often these patients complain of being able to see only one-half of an object, usually the lower half, as in looking at a man they can see his body but not his head. Vertigo is more or less a common symptom, and is

produced by the detached retina continuing to function to a degree. Central vision is good unless the macular region is involved.

If the detachment becomes complete the detached retina may overlay the macula and optic disc and vision in that eye be nil.

The objective signs are, a deepened anterior chamber with the tension usually minus, with the normal fundus-reflex lost wholly or in part.

The anterior chamber is deepened because of the lens having sunk backward.

In Fuch's textbook of ophthalmology we find this statement credited to Von Graefe: "In that form of detachment of retina which is produced by active propulsion of the retina away from the choroid the tension is not diminished, but rather is increased. Hence, increase of tension with detachment of the retina is in doubtful cases an argument that an intra-ocular tumor is the cause of the detachment."

The retina appears as a gray, (velvety gray or balloon cloth color) vibrating, rounded membrane up on whose folds we see the retinal vessels small, tortuous, and dark in color due to their having lost their central light streak, coursing over the membrane.

The vessels may even disappear in places as they dip into the folds of the membrane, then upon leaving this detached membrane to normal retina resume their normal color and characteristics.

In detachment due to tumors or recent hemorrhage the mass of folded retina does not vibrate with movements of the eye, but on the other hand remains stationary.

By means of transillumination the mass darkens the opposite wall of the globe while in the serous type transillumination is more nearly that of a normal eye.

Very often a rent or tear is seen in the detached retina either in the upper part or in the periphery of the fundus.

In the detachment due to cysticercus subretinalis detachment is seen as a round, sharply circumscribed area, the margin of which is light in color with the bluish-gray cysticercus bladder beneath the raised mass. This mass does not vibrate in contradistinction of that of the serous detachment.

Edema of the retina shows the fundus uniform and not folded as in detachment.

The variation in level of the affected portion can be recognized with the ophthalmoscope at a distance by the difference in the refraction of a blood vessel on the separated part and by following it into the normal retina. The amount or degree of elevation as you know can be measured with the ophthalmoscope.

The prognosis is unfavorable as the detachment tends to enlarge. In rare instances permanent reattachment occurs, but relapses are the rule and complete blindness follows.

I have purposely refrained from giving any treatment for the reason that to attempt it here would be unwise as well as unsatisfactory.

o

ETHYLENE

Following the explosion in Evansville, supposedly due to ethylene, Moses Salzer, Cincinnati (Journal A. M. A., June 22, 1929), undertook an investigation. He found that the quantity of ethylene capable of explosion at any one time is too small to produce any considerable damage. A nation wide survey of more than 425,000 ethylene anesthesias shows a remarkably favorable record. He concludes that ethylene is probably as safe, as ether, if not safer.

o

STABILITY OF DIGITALIS AND ITS PREPARATIONS

Six specimens of powdered digitalis have been examined by Harvey B. Haag and Robert A. Hatcher, New York (Journal A. M. A., July 6, 1929), in the laboratory after intervals varying from one to sixteen years, and in no case has deterioration been detected, and no one in the laboratory has ever observed anything indicative of deterioration in one of the many specimens of powdered digitalis used. Powdered digitalis, in tablets or in capsules, is admirably suited for securing uniformity of dosage where individual patients, clinics or groups of clinics are provided with sufficient to last one year or more. A sterile infusion of digitalis undergoes little change within several months, and deterioration then results solely in diminished activity, not in increased toxicity. The official tincture of digitalis retains its activity with comparatively little change during several years, and any change that does occur merely calls for a corresponding increase in dosage. The secret of deterioration of liquid preparations of digitalis has not been explained fully, and there is no evidence that any of these preparations are as stable as powdered digitalis kept with ordinary care in a corked glass bottle. Aqueous solutions of strophanthin, ouabain or other digitalis principles, kept in ampules of soft glass, deteriorate rapidly. Ouabain solution in ampules of hard glass decomposes slowly. Their investigation lends no support to the contention that any of the digitalis specialties are more stable than the official digitalis tincture. All liquid preparations of digitalis should bear the date of manufacture.

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EDITORIAL

TAXING THE PHYSICIAN BY LICENSE

The following communication, from the Attorney General's office, will be of interest to physicians, especially to those in small towns, who sometimes find themselves subject to petty taxes, under the guise of licensing. It would seem there is some question as to whether a small town may impose a requirement "license" upon a physician after he has already been duly licensed by the State. However, it is very likely that the Supreme Court will have to settle this.

The opinion of the Attorney General, that a license once revoked, may not be restored except through the manner in which it was originally secured, seems sound.

Dr. C. A. Thompson, *Secretary*,
The Oklahoma State Medical Association,
Muskogee, Oklahoma.

Dear Sir:

Your letter addressed to the Attorney General under date of October 20, 1930, has been referred to the writer for reply. With your letter you enclosed a letter which you received from Dr. C. H. Atkins of Boise City, Oklahoma, which letter reads as follows:

> "I address you regarding a condition that has come up out here.
>
> "The City Council has passed an occupation tax and have exempted the lawyers, barbers, insurance and hair dressers and possibly others.
>
> "Now what we want to know is, can they make the doctors and dentists pay this occupation tax? I maintain that it is class legislation and that it is doubtful if any occupation tax will stand up.
>
> "If there has ever been any decision handed down on this law in the State or elsewhere please advise, and if not, give me the best advice you can on the matter."

You request information concerning the question presented in Dr. Atkins' letter.

In reply you are advised that Section 4556 of the Compiled Oklahoma Statutes of 1921 authorizes the city council in cities to levy and collect a license tax on certain occupations. This section does not enumerate doctors and dentists as being occupations which may be taxed. The Supreme Court of this State has held this section of the Code to authorize city authorities to impose a license tax for revenue as distinguished from a license fee collected on account of necessary police regulation. Ex parte Marler, 282 Pac. 353.

It is the understanding of the writer that Boise City is a town and not a city. Therefore, the above statute would not apply to Boise City. The statute which is applicable to towns is Section 4763 of the Compiled Oklahoma Statutes of 1921. Said statute reads as follows:

> "The board of trustees shall have authority to levy and collect a license tax on auctioneers, contractors, druggists, hawkers, peddlers, brokers, bankers, pawnbrokers, merchants of all kinds, grocers, confectioners, restaurants, butchers, taverns, public boarding houses, billiard

and pool tables, bowling alleys, drays, hacks, carriages, omnibuses, carts, wagons and all other vehicles used in the town or village for pay; hay scales, lumber dealers, furniture dealers, saddle and harness dealers, jewelers, livery stable keepers, real estate agents, express companies or agencies, life or fire insurance companies or agencies, shows, theatres, all exhibitions for pay, doctors, dentists, blacksmiths, all manufacturing establishments, cotton gins, mills and elevators, plumbers and tinners, Provided, however, that all scientific and literary lecturers' entertainments shall be exempt from taxation, and also all concerts and musical or other entertainments given exclusively by citizens of the town. The tax so levied and collected therefrom shall be applied for the use and benefit of such town as may be directed by the board of trustees thereof."

You will note that this statute authorizes the Board of Trustees of a town to levy and collect a license tax on a great number of occupations, including doctors and dentists. This statute is similar to Section 4556, supra, and, therefore, authorizes the imposition of a license tax for revenue as distinguished from a license fee collected on account of necessary police regulation.

Dr. Atkins suggests that the occupation tax levied against doctors and dentists is illegal because the tax is not levied against lawyers, barbers, and others, and that, therefore, it is class legislation. The tax would not be illegal for that reason because the Constitution only requires that taxes shall be uniform upon the same class of subjects. See Section 5 of Article X of the State Constitution. Further, in this connection, your attention is directed to Section 1101 of McQuillin on Municipal Corporations, which reads in part as follows:

"Constitutional provisions requiring that taxation shall be equal and uniform throughout the state have no application to the taxation of trades, professions and occupations, but apply only to direct taxation on property as such. However, the rule is that all persons engaged in the the same occupation, profession, or class of business, must be taxed equally and uniformly. Hence, an ordinance which discriminates against non-residents and in favor of residents by imposing a license tax in a different manner or at a different rate from that imposed on residents is unconstitutional. So all ordinances which discriminate in the license tax imposed by them against persons or products of other states are uniformly held void as in violation of the Federal Constitution. And the rule is also unformly enforced that any discrimination as to persons of a class, in the ordinance imposing the license will invalidate the legislation and render the collection of the license fee void."

The difficult question that is presented is whether after the State has licensed a doctor or dentist to practice within the State, a municipal corporation may prevent the doctor or dentist from practicing without first paying a license tax to the municipality.

In this connection the case of the Mayor and Aldermen of Savannah, vs. Thomas J. Charlton, 36 Ga. 460, may be of interest to you. In this case the Supreme Court of Georgia held as follows.

"When a physician is licensed by the authority of the State to practice medicine, the city of Savannah cannot require him, under a penalty, to take out license before he can practice his profession in the city.

"The practice of his profession in the city is the subject of taxation by the corporation, but not of a license."

The first legislature after statehood provided for the licensing of physicians and provided that the certificate issued by the State to a physician authorized him to practice medicine and surgery in this State. See Section 6898, Revised Laws of Oklahoma 1910, enacted by the 1907-08 Legislature. This same legislature enacted Section 4763, quoted above, and authorized the Board of Trustees of a town to levy and collect an occupation tax on doctors and dentists. Likewise, in 1905, the legislature provided for the licensing of persons to practice dentistry within the State of Oklahoma. See Section 6820, Revised Laws of Oklahoma, 1910.

The present laws regulating the practice of medicine and dentistry in this State were enacted subsequent to the enactment of Section 4763, supra, but these statutes (Sections 8701-8729, C. O. S. 1921; Ch. 59, S. L. 1923) do not prohibit a town from exercising the authority granted to it by Section 4763, that is, to levy and collect an occupation tax for revenue purposes only from doctors and dentists.

It, therefore, is the opinion of the Attorney General that the legislature has provided for the regulation of the practice of medicine and dentistry in this State by the State, and at the same time has provided that towns may levy and collect a license tax or occupation tax for revenue against doctors and dentists. Cities have not been authorized to levy and collect such a tax from doctors and dentists.

The following excerpt from McQuillin on Municipal Corporations (Section 1102) may be of interest in regard to the reasonableness of the amount of the license tax.

> "Where the exaction is imposed under the power to regulate or in the exercise of the police power, as distinguished from the power to tax for revenue, as heretofore explained, the general rule obtains that the sum levied cannot be excessive nor more than reasonably necessary to cover the costs of granting the license and of exercising proper police regulation. **** Where under undoubted charter power, the tax is imposed for revenue alone, or for police regulation and revenue, the amount thereof is usually a matter for determination by the legislative branch of the municipal government. Ordinarily the courts will decline to interfere on the ground that the amount is oppressive or unreasonably large. They incline to defer to the judgment and discretion of the corporate authorities, and frequently presume that the amount demanded is reasonable, particularly in the absence of evidence to the contrary.****"

Very respectfully,
For The Attorney General
Randell S. Cobb,
Assistant Attorney General

Approved in Conference 10-25-30.

—o—

REVOKED LICENSES CANNOT BE RESTORED

Oklahoma City, Okla.
October 14, 1930.

Dr. J. M. Byrum, *Secretary*,
Board of Medical Eaminers,
Shawnee, Okla.

Dear Sir:

The Attorney General acknowledges receipt of your letter of October 10, 1930, in which you make the following inquiry: "Has the Board of Medical Examiners of Oklahoma the power to restore a medical license, once revoked in this State?"

Section 8806 Compiled Oklahoma Statutes 1921 is as follows:

> "When any applicant has shown himself to be possessed of the qualifications herein required and has successfully passed the examination, a certificate must be issued to him by said board authorizing him to practice medicine and surgery in this State. Said certificate shall be signed by each member of the board and sealed with seal of said board: Provided, however, that all physicians and surgeons who were legally licensed and practicing in Oklahoma Territory and the Indian Territory on the 16th day of November, 1907, shall be required to register with the said board, but shall be exempt from examination except as to their credentials, and shall be entitled to reregistration with the said board, and certificate of registration free of cost."

Section 8812 Compiled Oklahoma Statutes 1921 provides for revocation of certificates and is as follows:

> "Whenever any holder of a certificate, issued as herein provided, shall be guilty of unprofessional conduct as defined by this act (article), and such unprofessional conduct is brought to the attention of the board against said certificate, in the manner herein pointed out, it shall be their duty to, and they must at once revoke the same, and the holder of such certificate shall not thereafter be permitted to practice medicine and surgery or in any other departments of medicine and surgery in this State. But no such revocation shall be made unless such holder is cited to appear and the same proceedings are had, as is hereinbefore provided in this section, in case of refusal to issue certificates. The accused party, at the time he presents his answer for filing, shall deposit with the secretary must not file his answer, and default may be thereon entered against him, and his certificate revoked if the charges on their face be deemed sufficient by the board. When the certificate is revoked, the secretary of the board, if the certificate has been deposited with him, shall write across the face thereof in red ink the fact of such revocation, and shall file such certificate so revoked among the archives of his office under the seal of the board to the county clerk of the county of which the certificate of the person whose certificate has been revoked is recorded, and said county clerk must thereupon write on the margin or across the face of his register the fact and day of such revocation in accordance with this article. From the time of the revocation of certificates the holder shall be disqualified from practicing medicine in this State."

Section 8813 defines unprofessional conduct and is as follows:

> "The words 'unprofessional conduct,' as used in this article, are hereby declared to mean:
>
> "First. The procuring, or aiding or abetting in procuring, a criminal operation.
>
> "Second. The obtaining of any fee on the assurance than an incurable disease can be permanently cured.
>
> "Third. The wilful betrayal of a professional secret to the detriment of a patient.
>
> "Fourth. All advertising of medical business in which grossly improbable statements are made that are calculated to mislead the public.

"Fifth. All advertising of any medicine or means whereby the monthly periods of women can be regulated or menses re-established if suppressed.

"Sixth. Conviction of any offense involving moral turpitude.

"Seventh. Habitual intemperance, and the habitual use of habit-forming drugs.

"Eighth. The employment of what is commonly known as 'cappers' or 'steerers' in procuring practice. These specifications are not intended to exclude other acts for which license may be revoked on the ground of unprofessional conduct."

The Board of Medical Examiners are not empowered by our statutes to restore a medical license, once revoked.

It is therefore the opinion of the Attorney General that the Board of Medical Examiners are without power or authority to restore a medical license, once revoked, unless the applicant proceed in the same manner as required in first obtaining license.

Respectfully,
For The Attorney General
Edward Crossland,
Assistant Attorney General

Approved in Conference 10-15-30.

TULSA ACADEMY OF MEDICINE, THIRD ANNUAL CLINIC DAY

The Third Annual Clinic Day of the Tulsa Academy of Medicine is to be held at Morningside Hospital, Tuesday, Nov. 18th. The meeting is an all day and evening meeting with Dr. Meyer Wiener, Associate Professor of Ophthalmology, Washington University, St. Louis, Mo., as the principal speaker. He will conduct a clinic in the afternoon on Plastic Surgery of the eyelids, and will speak in the evening on certain eye conditions of importance in the work of the general practitioner.

The day session at Morningside Hospital will begin at 9:00 A. M., with a three hour period of surgical clinics. Lunch will be served at the Hospital with visiting doctors the guests of the Hospital. The afternoon will comprise medical clinics and demonstrations with Dr. Wiener's clinic.

The Mayo Hotel will serve an evening banquet, and Dr. Wiener will speak.

The Annual Clinic Day has been arranged so that except for transportation and hotel accommodations, where required, there will be no expense attached to attendance. There is no registration fee and no charge for luncheon or the evening banquet.

Officers of the Tulsa Academy of Medicine are: Doctors James Stevenson, President; Charles J. Woods, Vice-President; Ned R. Smith, Secretary and Treasurer.

—Contributed

Editorial Notes—Personal and General

DR. W. P. LONGMIRE, Sapulpa, attended the Kansas City Clinics the first part of October.

DR. S. H. WILLIAMSON, Duncan, who has been ill for the past month is reported improving.

DR. H. T. BALLANTINE, Muskogee, is reported improving after an illness of the past two weeks.

DR. HALSELL E. FITE, Muskogee, attended the Philadelphia meeting of the American College of Surgeons.

DRS. C. R. SILVERTHORNE and C. E. WILLIAMS, Woodward, attended the Kansas City Clinics in October.

DRS. FRANK H. McGREGOR, Mangum, and S. E. MITCHELL, Muskogee, attended the American Legion Convention in Boston.

DR. D. LONG, Duncan, attended the annual meeting of the Rock Island Surgeon's Association at Hot Springs, Arkansas, in October.

DR. F. T. GASTINEAU, Vinita, will spend six months at Tulane Medical School, New Orleans, doing Eye, Ear, Nose and Throat work.

OSAGE COUNTY Medical Society met at the Duncan Hotel, October 6th, Pawhuska. Dr. Wade Sisler of Tulsa was the principal speaker.

MUSKOGEE COUNTY Medical Society met, Monday, October 26th. After transaction of business matters Dr. F. G. Dorwart delivered a talk on "Heart Conditions."

GARVIN COUNTY Medical Society met in Pauls Valley, October 22nd, at the office of Dr. W. P. Greening. Dr. Floyd Gray, Oklahoma City spoke on "Obstetrics."

SEMINOLE COUNTY Medical Society met October 16th, in the offices of Dr. J. A. Bates, Seminole. Following a business session of the regular meeting, an interesting round table discussion ensued.

WOODS AND ALFALFA COUNTY Medical Societies held a joint meeting the first of October with Dr. W. E. Simon, Alva, as host. Drs. Carroll M. Pounders, and C. P. Bondurant, both of Oklahoma City, read papers.

POTTAWATOMIE COUNTY Medical Society, after noting one of the picture films, owned by our association and distributed by the Extension Department of the Oklahoma University, passed resolutions of hearty endorsement and commendation of this work.

DR. J. H. ROBINSON of the Oklahoma City Clinic has just returned from a month's visit in the East visiting Clinics and Maternity Hospitals, among the places being Millars Filmore Hospital, Dr. Potter in Buffalo, Cleveland Maternity Hospital, Chicago Lying-In.

OKMULGEE-OKFUSKEE COUNTY Medical Societies met October 20th, Masonic Hall, Okemah. The following was the program: Sodium Amytal Anesthesia, by Dr. F. LeRoy Carson, Shawnee. The use of Iodized Oil in Chronic Pelvic Disorders, by Dr. Edward Witcher, Tulsa.

CADDO COUNTY Medical Society held their monthly meeting at Anadarko, Wednesday, October 22nd, according to the report of Dr. P. H. Anderson, Secretary-Treasurer. Doctors Hugh Jeter and W. K. West, both of Oklahoma City, spoke on "Nephritis" and "Deformities of the Arm" respectively.

LINCOLN COUNTY Medical Society met at Chandler, October 1st. Dr. Horace Reed, Oklahoma City, spoke on Goiter, Dr. M. B. Glismann, Okmulgee, read a paper on Obstetrics. The paper and lecture were discussed by Drs. Hatchett, Wells, and Eskridge, of Oklahoma City; Drs. Marshall of Chandler, and Anderson of Shawnee. Dr. Marshall acted as chairman.

ORTHOPAEDIC SURGERY

Edited by Earl D. McBride, M.D
717 North Robinson Street, Oklahoma City.

The Operative Treatment of Paralytic Deformities of the Foot. Leo Mayer. Am. J. Surg. VII, 80, July, 1929.

The author outlines the operative methods which he has employed during the past five years in the correction of the various types of paralytic foot deformities.

Paralytic valgus: (1) mild grade, due to weakness of the tibialis anticus and tibialis posticus, with no marked bony deformity, is treated by manipulation and immobilization in a position of varus; (2) moderate grade, with paralysis of tibialis anticus and weakness of tibialis posticus and other invertors, with definite bony deformity, is treated by the Hoke stabilizing operation. Inversion can be developed by the synergistic action of the extensor proprius hallucis and Achilles tendon; and (3) severe grade, with complete paralysis of tibialis anticus and tibialis posticus, extensor proprius weak, evertors strong, and marked downward displacement of head of astragalus, is treated by transplanting the peroneus longus or peroneus tertius and extensor longus digitorium to the evertors. The Hoke operation is performed for correction of the bony deformity.

Paralytic varus: (1) mild grade, with weakness of evertors without bony deformity, is treated by transplanting the tibialis anticus or the extensor proprius hallucis to the outer border of the foot by the intrasheath method; (2) moderate and marked grades, with paralysis of evertors and bony deformity of greater or lesser degree, require bone operation. If there is either a tibialis anticus or extensor hallucis suitable for transplantation, the Hoke operation is used, care being taken to resect enough bone from outer portion of astragalocalcaneus joint to permit complete correction of inversion of oscalcis. If astragalus is inverted, a wedge resection from the body is done. Then one of the tendons mentioned is transplanted, preferably by the intrasheath route.

If the tibialis anticus and extensor proprius are absent, equinus is usually present. The Achilles tendon is then lengthened and the Hoke operation with the Campbell bone block is done, to prevent the equinus returning.

In the case of equinus deformity with (1) peroneals present, the longus is transplanted to the inner side of the foot by intrasheath route and the brevis to the outside by the subcutaneous route; the Hoke operation is done, also, to prevent a possible varus deformity; (2) peroneals absent, the Campbell boneblock operations is done.

Calcaneus is corrected not by the Whitman operation, but by the Hoke operation modified by the Putti bone block combined with transplantation of the peroneals, the tibialis posticus, and flexor longus hallucis. At least two tendons should be transplanted—one from the outer and inner groups,—by bringing them through a slit in the Achilles tendon and fastening to the oscalcis near its posterior tubercle.

In mild cavus deformity the Steindler stripping operation is used. If inversion is present the extensor digitorum longus is transplanted to the outer side of the foot through a drill hole in the fifth metatarsal. In the severe grade with more or less bony deformity a wedge is taken through the calcaneocuboid and astragaloscaphoid joints, —the long and short plantar ligaments divided beneath the cuboid and the plantar fascia subcutaneously

Dangle foot with hip and knee muscles functioning is treated by; (1) Arthrodesis of the astragaloscaphoid, calcaneocuboid, and clacaneoastragaloid joints. The tibiotarsal joint is only partially denuded of cartilage to insure a little motion in the ankle; (2) after arthrodesis the Putti bone block and the Campbell bone block are used. If the knees and hip muscles are weak, complete ankylosis of the entire ankle joint is desirable, and besides arthrodesis a tibial bone graft from tibia to astragalus is used.

The Colon in Relation to Chronic Arthritis. E. C. Fishbaugh. Am. J. Surg. VII, 561, September, 1929.

The author feels that most cases of chronic arthritis with gastro-intestinal disease are of the infectious type of arthritis, and found that eighty patients out of 324 adults with infectious arthritis had abdominal pathology, who were free from any other foci of infection. Females predominate in the series, there being sixty-six females to fourteen males, with an average of forty-seven. Five conditions are found to be of importance; chronic constipation, chronic or subacute colitis, bands and adhesions, diverticulae, rectal crypts and hemorrhoids.

Treatment is along dietary and eliminative lines after surgical rectification of the abnormalities. Stress is laid upon the proper irrigation of the colon, especially in the right-sided ideal stasis type of case. The use of acidophylus culture is also recommended.

Several case reports are added which stress the importance of proper intestinal elimination in this type of case.

Reconstruction of The Hip Joint in Congenital Dislocations. Wm. J. Merrill. Ann. Surg. XC 106, July, 1929.

In old unreduced congenital hips, after manipulations have failed, the author advised an open reduction and the formation of a strong, new acetabulum by removing a rectangular section of the upper half of the acetabulum including the roof and the floor. This section is displaced upward and outward and tilted outward, extending this roof well out over the femoral head. The leg is fixed in abduction and this is maintained until the x-ray indicates that the bone will withstand weight-bearing. This position is maintained first by plaster bandages, then a walking brace until stability is assured, even for a period of five years after operation.

TUBERCULOSIS

Edited By
L. J. Moorman, M.D. and Floyd Moorman, M.D.
912 Medical Arts Bldg., Oklahoma City

Healing of Tuberculosis by F. M. Pottenger, M.D. Annals of Internal Medicine Sept. 1930.

The tubercle bacillus acting upon different individuals produces disease pictures of great variety, which are combatted with different degrees of effectiveness. According to the author, the program of defense differs according to whether it is a first or succeeding infection. The former is opposed at first by only the natural defense of the host, and later by a developing specific defense; the latter by both natural and specific defense from the start. We are always dealing with infection in the immune, so the specific factors in defense are always present and upon the degree of their competence depends largely the nature, the course and the outcome of the disease.

Healing in tuberculosis, according to the author, in the immune or adult type is accomplished thru several different processes: (1) destruction of bacilli; (2) retardation of the passage of bacilli thru the tissues; (3) elimination of bacilli thru natural channels by caseation and cavity formation; (4) development of a state of desensitization to bacillary and other toxins; (5) encapsulation or rendering inactive, viable bacilli which remains in the tissues; (6) ridding the body of the inflammatory products which accompany the infection; and (7) repair of the injury inflicted upon the body by the disease.

Healing depends on the power of the patient to meet successfully the various requirements of his own particular infection, no matter what they may be. Therefore, measures of therapy have been devised which have for their purpose the creating of the best possible physiologic balance on the part of each individual patient, and the keeping of his infection as mild as possible.

Rest is a matter of necessity, because we have a departure from the normal status of such a nature that exercise during the stage of active disease favors extension of infection, increase of toxemia, and lowers resistance, causing the patient's body functions to be carried on at a low standard of efficiency. Rest to the lung, such as comes from body rest, and such local measures as compression by weights, such as shot bags, strapping, operations on the phrenic nerve, pulmonary compression, whether by pneumothorax, or thoracoplasty, are of value. They all serve the purpose of giving the lung more rest.

A well balanced diet is essential to the best progress.

The Significance of Advanced Tuberculous Infection of School Children. By Eugene L. Opie, M.D., October 18, 1930.

The author in a timely article discusses the significance of the tuberculous lesions in school children. It varies widely:

A. Demonstrable tuberculous infection with the following characteristics is prevalent among healthy children and requires no special care to prevent its further development.

1. Infection revealed by the tuberculin test with no lesion demonstrable by roentgenologic examination.

2. Circumscribed pulmonary nodules that have undergone calcification.

3. Roentgenographically demonstrable tuberculosis of tracheobronchial lymph nodes.

B. Children with the following conditions are in danger of tuberculosis that will undermine health and should receive special care in open air schools, preventoria or by other means to prevent further progress of the disease.

1. Latent tuberculous infiltration of the childhood type evident in roentgenograms, often associated with tuberculosis of the tracheo-bronchial lymph nodes. In some instances, particularly in older children, these lesions are the scars of healed infection and do not require special care.

2. Tuberculosis of tracheo-bronchial lymph nodes with some calcification, recognizable by roentgenological examination, (a) when the child is still in contact with open tuberculosis; (b) when the tuberculin reaction is intense; (c) when the lesions are unusually large or very numerous.

Changes in the Respiratory Mechanism Following Phrenicectomy. By Walter L. Werner, M.D. Journal of A.M.A. October 18, 1930.

The author studied the changes in the respiratory mechanism following phrenicectomy on twenty patients. He summarizes it as follows:

(1) The vital capacity decreased in all patients.

(2) In all but one patient the tidal area decreased.

(3) The oxygen consumption remained practically unchanged.

(4) This compensation took place in three different ways:

(a) The compensation was achieved by an increase in the respiratory labor only.

(b) The compensation was achieved by a better

utilization of the inspired air with no change in the respiratory labor.

(c) The compensation was achieved only by a more efficient utilization of oxygen with a decrease in the respiratory labor. There was no evident correlation between the extent and the pathologic-anatomic type of the lesions and the mechanism of compensation following the operation.

3. Latent tuberculosis of adult type.

4. Arrested pulmonary tuberculosis, notably in children who have been discharged from sanatoria.

5. An active tuberculin reaction or an otherwise negligible tuberculous lesion recognized by roentgenologic examination in association with impaired health and conspicuous underweight, which are perhaps not referable to tuberculosis.

C. Children who should receive sanatorium treatment or its equivalent are:

1. Children with tuberculous lesions accompanied by symptoms and physical signs referable to tuberculosis.

2. Children with latent lesions of the lung either of childhood or adult type that on repeated roentgenologic examinations are found to be progressive.

3. Children with massive tuberculosis of tracheo-bronchial lymph nodes that has not undergone calcification.

BOGY OF HEART-BLOCK IN DIGITALIS THERAPY

William D. Reed, Boston (Journal A.M.A., June 22, 1929), asserts that the fear of the production of heart-block by digitalis medication seems to indicate a misconception of the therapeutic use of this drug. Heart-block is not a prominent feature of the toxic action of digitalis. In fact, some degree of impairment in auriculoventricular conduction usually appears at the dosage associated with the therapeutic effects. There are no records of adequately studied patients who have died solely as a result of digitalis-induced heart-block. Complete heart-block may sometimes be present for years in patients who experience little if any reduction in their ability to perform heavy muscular work. The ventricle possesses tissue that is capable of initiating contractions, and the circulation adjusts to the slowed rate without untoward symptoms. Heart-block, not drug-induced, is usually associated with some serious form of heart disease whose lesions are not limited to the junctional tissues. It is the widespread and often progressive lesions of these diseases which doubtless have caused heart-block to be considered serious. The production of therapeutic heart-block of a degree sufficient to slow the ventricular rate to normal, in such conditions as auricular fibrillation with an accelerated heart (ventricular) rate, is an established principle in the use of digitalis medication. It is occasionally beneficial to convert partial into complete heart-block. Digitalis is often of benefit in complete heart-block with insufficiency of the heart. Reid concludes that the inordinate fear of the production of heart-block by digitalis may be disastrous in those cases in which the patient's only chance is dependent on the full therapeutic effects of the drug. Digitalis should be administered until beneficial results are obtained or there is evidence of toxic effects.

GASTRIC DIGESTION OF MEAT IN HEALTH AND IN DISEASE

In the diseased patient as exemplified by the chronic invalid with cardiac or renal disease, blood dyscrasia, and other conditions commonly encountered in medical ward service, the gastric digestion of meat is somewhat impaired. The results recorded by Martin E. Rehfuss and George H. Marcil, Philadelphia (Journal A. M. A., March 9, 1929), were obtained after the ingestion of 60 Gm. portions. The significance of this was not determined experimentally, but it is probable that figures somewhat lower are obtained when smaller quantities of meat are ingested. In purely functional conditions and probably with peptic ulcer, meat digestion is not impaired so far as the secretory function is concerned. The authors would emphasize the necessity of examining all persons who show a minimal secretory response with an Ewald meal and a meat meal. In a certain proportion of cases the responses are prompt and direct with meat. Such a response offers a better prognosis. Failure to respond to both an Ewald meal and a meat meal may be of serious prognostic importance They encountered this lack of response in pernicious anemia and gastric carcinoma. On the other hand, it was seen also in delayed resolution in lobar pneumonia and in chronic cholecystitis. A failure to respond to an Ewald meal is much more common than failure to respond to a meat meal. The authors believe that there is a normal difference in the total acidity produced by meat and breadstuff, in favor of the former to the extent of probably 30 per cent or more. Persons giving a similar response to bread and meat cannot be considered normal. Rehfuss and Marcil believe that the use of the two meals gives more reliable evidence of mucosal efficiency, particularly when subacid or anacid responses are obtained with an Ewald meal. The explanation of the greater response of the normal stomach is not attempted in this communication. Meat is a true intragastric stimulant, in health capable of producing a maximum response on the part of the gastric mucous membrane. That this response is altered in disease mut be evident from the limited number of cases here studied.

VARICOSE VEINS AND THEIR SEQUELAE

One hundred and sixty cases of varicose veins and their sequelae were studied by Geza de Takats, Chicago (Journal A. M. A., March 9, 1929), as to age and sex incidence. More than 1,000 injections with 50 per cent dextrose were made. An individualizing management, consisting of supportive, injection and surgical treatment or their combination is described. The histological reaction of the vein following injection has been studied. Immediate results of the various forms of treatment are tabulated. The possibility of pulmonary embolism following injection treatment and surgical treatment discussed. The end-results of the surgical and injection treatment can be estimated only after five years. Recurrences are well known to occur after radical excisions and may be expected following the injection treatment.

ALLERGIC PURPURA

H. L. Alexander and C. H. Eyermann, St. Louis (Journal A. M. A., June 22, 1929), have called attention to the occurrence of allergy with Henoch's purpura and cite six new cases. In each instance it was demonstrated that the lesions were caused by the ingestion of particular foodstuffs. In two other patients, allergic manifestations and purpura coexisted but no particular foodstuff was incriminated.

MANUFACTURED WEATHER

The so-called present high standard of living, which contrasts so markedly with that of a generation ago, depends for its maintenance on circumstances arising in large scale production and standardization. Perhaps no more striking characteristic of modern industry can be mentioned than its gradually developing independence of nature. It is only by the assurance of dependable uniformity in supply of raw material, in transportation and in mechanical power that quantity production with the net gain to the consumer has been made possible. One of the factors of large importance to many industrial processes is grouped under the term "atmospheric conditions." In a recent account Lindsay[1] has described the rise of the new ventilation engineering and has pointed out the wide application already made of this specialty in a variety of industries.

The temperature, moisture and movement of air are of considerable importance in many manufacturing processes; in the past, the location of mills frequently depended on the prevailing atmospheric conditions of a region. The situation is now largely changed and, by the use of the newer methods of air conditioning materials can be dried or made moist, rapidly or slowly at any temperature desired. Such procedures as the drying of pottery, the curing of tobacco and the moistening of leather for the uppers of shoes are now in many plants dependable and under perfect control, requiring far less time and floor space and resulting in a more uniform product with less breakage and spoilage than with the older methods. The manufacture of rayon, of which 98,000,000 pounds was made in the United States last year, requires controlled air conditions throughout the process. The milling of the finest grades of flour involves an accurate adjustment of temperature and moisture conditions in the atmosphere, while the processing, wrapping and sealing of many of our food products is possible on a large scale only because the air in the factories is "manufactured" to order.

It is obvious that, when the air of a manufacturing plant is conditioned, the persons employed are benefited. Since happiness and efficiency are increased when people are physically comfortable, many installations of air-conditioning apparatus have been made for this purpose alone. Furthermore, uniform air conditions during working hours tend to minimize the economic and industrial losses from the common so-called respiratory diseases. The use of cleansed, cooled and dehumified air in summer and of warmed and properly humidified air in winter cannot but add to the enjoyment of a performance in a movie theater.

While modern industry is thus increasingly availing itself of the products of scientific research, the effects on the individual employee are not always so beneficial as in the case discussed; indeed, the circumstances surrounding the manufacture of certain widely used products may constitute an industrial hazard of the most dangerous type. Only recently attention has been directed in these columns[2] to the insidious effects of the radiations from radium paint used to letter watch dials, speedometers and similar pieces of apparatus. The outlook for those affected is so hopeless that renewed emphasis should be given to the tremendous importance of enforced prophylaxis, and nothing should be left to chance or perfunctory advice. The fabric of modern society is so complex that progress made in one direction usually necessitates readjustments, not all of which are happy.—Jour. A. M. A., July 6, 1929.

1. Lindsay, D. C.: J. Indust. & Engin. Chem. **21**: 502, 1929.

2. Radiosensitivity of Bone, J. A. M. A. **92**: 1447 (April 27) 1929.

REPORT OF EXAMINATION FOR LICENSES TO PRACTICE MEDICINE

Examination held at State Capitol, Oklahoma City, September 9th and 10th, 1930. The following applicants passed:

Name	Year of Birth	Place of Birth	School of Graduation	Year of Graduation	Home Address or Previous Location
Baylor, Richard Aloysius	1906	What Cheer, Iowa	Univ. Iowa	1929	Fairfax, Okla.
Burpee, Geo. Drederick	1904	Janesville, Wis.	Washington Univ.	1929	Drumright, Okla.
Dever, Harvey Kendall	1906	Gifford, Mo.	Kansas Univ	1930	El Reno, Okla.
Howe, Julius Holland	1887	Spencerville, O.	Univ. Louisville	1916	Ponca City, Okla.
Lewis, Edwin	1866	Blakesburg, Ia	Central Med Col. St. Joseph, Mo.	1903	Oklahoma City
Lindley, E. C.	1905	Stanberry, Mo.	Washington Univ.	1929	Duncan, Okla.
Lindsey, Ray Harvey	1904	Elmore City, Okla.	Northwestern	1929	Pauls Valley, Ok.
Jones, Isaac Grady	1888	Petersburg, Tenn.	Vanderbilt	1919	Broken Bow, Ok.
Pace, Lloyd Rio	1886	Benton, Ky.	Univ. Louisville	1909	Seminole, Okla.
VanSandt, Bax Morton	1904	Wewoka, Okla.	Univ. Cincinnati	1930	Wewoka, Okla.
Ward, Benjamin Walter	1901	New Orleans, La.	Tulane Univ.	1925	Tulsa, Okla.
Cunningham, John Perry	1900	Green Forest, Ark.	Baylor Univ.	1930	Oklahoma City
Glomset, John Larson	1901	N. Dakota	Washington Univ.	1930	Oklahoma City

OFFICERS OKLAHOMA STATE MEDICAL ASSOCIATION

President, 1930-31, Dr. E. S. Ferguson, Oklahoma City.
President-elect,
Dr. Howard C. Weber, Bartlesville.
Secretary-Treasurer-Editor, Dr. Claude A. Thompson, Muskogee.
Meeting Place, 1931, Oklahoma City.
Delegates to A. M. A.: Dr. Albert W. Cook, Tulsa, 1931-32; Dr. Horace Reed, Oklahoma City, 1931-32; Dr. McLain Rogers, Clinton, 1930-31.

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General Medicine: Dr. Ben H. Cooley, Chairman, Norman; Dr. Henry H. Turner, Secretary, 1200 North Walker, Oklahoma City.

Eye, Ear, Nose and Throat: Dr. Ruric N. Smith, Chairman, Medical Arts Building, Tulsa; Dr. A. L. Guthrie, Secretary, Medical Arts Building, Oklahoma City.

Surgery: Dr. W. C. Vernon, Chairman, Okmulgee; Dr. Leonard Williams, Secretary, 1200 North Walker, Oklahoma City.

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Public Policy and Legislation. Dr. J. M. Byrum, Chairman, Shawnee; Dr. R. V. Smith, Tulsa; Dr. McLain Rogers, Clinton.

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Medical Economics. Dr. W. H. Bailey, Chairman, Oklahoma City; Dr. J. Hutchings White, Muskogee, Dr. T. C. Sanders, Shawnee.

SPECIAL COMMITTEES 1930-1931

Tuberculosis Study and Control. Dr. L. J. Moorman, Chairman, Oklahoma City; Dr. F. P. Baker, Talihina; Dr. R. M. Shepard, Tulsa.

Conservation of Vision. Dr. W. A. Cook, Chairman, Tulsa; Dr. C. B. Barker, Guthrie; Dr. Milton K. Thompson, Muskogee.

Conservation of Hearing. Dr. L. C. McHenry, Chairman, Oklahoma City; Dr. Chas. M. Fullenwider, Muskogee; Dr. H. S. Brown, Ponca City.

Venereal Disease Control. Dr. Rex Boland, Chairman, Oklahoma City; Dr. Henry S. Browne, Tulsa; Dr. S. D. Neeley, Muskogee.

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